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Lead: An old problem — New perspectives

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The latest studies show that blood levels of lead less than 25 micrograms per deciliter (µg/dL), the current intervention level for childhood lead screening, can cause subtle but serious health problems.

The knowledge that lead has adverse health effects on humans dates back to the ancient Greeks and Romans. Lead poisoning in children was recognized as a clinical entity by physicians in the 1920's. Yet with its long history of recognition, lead poisoning remains a persistent public health threat.

In the past, leaded paint and occupational exposure were the issues of concern. Although they continue to be associated with severe lead poisoning, research has shown that other environmental sources can significantly contribute to elevated human lead levels. These other sources are detailed in Figure 1 on page 2.

Changes in Elevated Blood Lead Standards Through the Years

Year	Blood Lead Level (µg/dL)
1960	60
1978	30
1985	25
199?	10-15??

The main target organ for lead is the central nervous system, especially during the early developmental stages. Other targets are the biosynthetic systems involved in the production of heme and blood and the system that regulates vitamin D, which involves the kidneys, and calcium metabolism. See Figure 2.

The newest findings regarding lead are most significant in the area of fetal and childhood health effects. Recent evidence has shown that levels previously thought to be acceptable are now believed to be associated with adverse effects.

- Fetal exposure to maternal blood lead levels in the range of **10-15** µg/dL has been associated with reductions in mental development, gestational age, and birth weight in infants. (1,2,3)
- Levels of about **20** µg/dL have been associated with decreased IQ and growth in young children. (1,2,3)
- Levels at and above **25** µg/dL may cause increased blood pressure in adult males. (1,2,3)
- **No** precise threshold for effects has been identified. (1,2,3)

In light of these studies the Centers for Disease Control (CDC) is considering lowering its definition of an elevated blood lead level. Indications are that it may be lowered to 10-15 µg/dL, which is close to the average blood level in the U.S. population. This level, if adopted, would have far-reaching effects on lead screening techniques as well as the number of individuals considered to be at risk. Currently, the EP (erythrocyte protoporphyrin) screening method is not accurate enough to be used to screen for those low blood lead levels.

At this time, St. Louis City, St. Louis County, Kansas City and Springfield are the only health departments in Missouri with routine childhood lead screening programs. They are provided to children involved in the women, infants and children nutrition program (WIC) and child health clinics.

Children at high risk for elevated blood lead are those who are between the ages of nine months and six years (especially those 12-36 months old) and live in or are frequent visitors to old, dilapidated housing; have siblings with known lead toxicity; live near lead smelters, lead processing plants, or hazardous waste sites containing lead or lead products; or have household exposure to persons in

Inside this Issue...

Occupational

- Plumbers, pipe fitters
- Lead miners
- Auto repairers
- Glass manufacturers
- Shipbuilders
- Printers
- Plastic manufacturers
- Lead smelters and refiners
- Policemen
- Steel welders or cutters
- Construction workers
- Rubber product manufacturers
- Gas station attendants
- Battery manufacturers
- Bridge reconstruction workers

Environmental

- Lead-containing paint
- Soil/dust near lead industries, roadways, lead-painted homes
- Plumbing leachate
- Ceramicware
- Leaded gasoline

Hobbies and Related Activities

- Glazed pottery making
- Target shooting at firing ranges
- Lead soldering (e.g., electronics)
- Painting
- Preparing lead shot, fishing sinkers
- Stained-glass making
- Car or boat repair
- Home remodeling

Substance Use

- Folk remedies
- "Health foods"
- Cosmetics
- Moonshine whiskey
- Gasoline "huffing"

ATSDR *Case Studies in* Environmental Medicine—*Lead Toxicity* (1990)

Figure 1. Sources of lead exposure

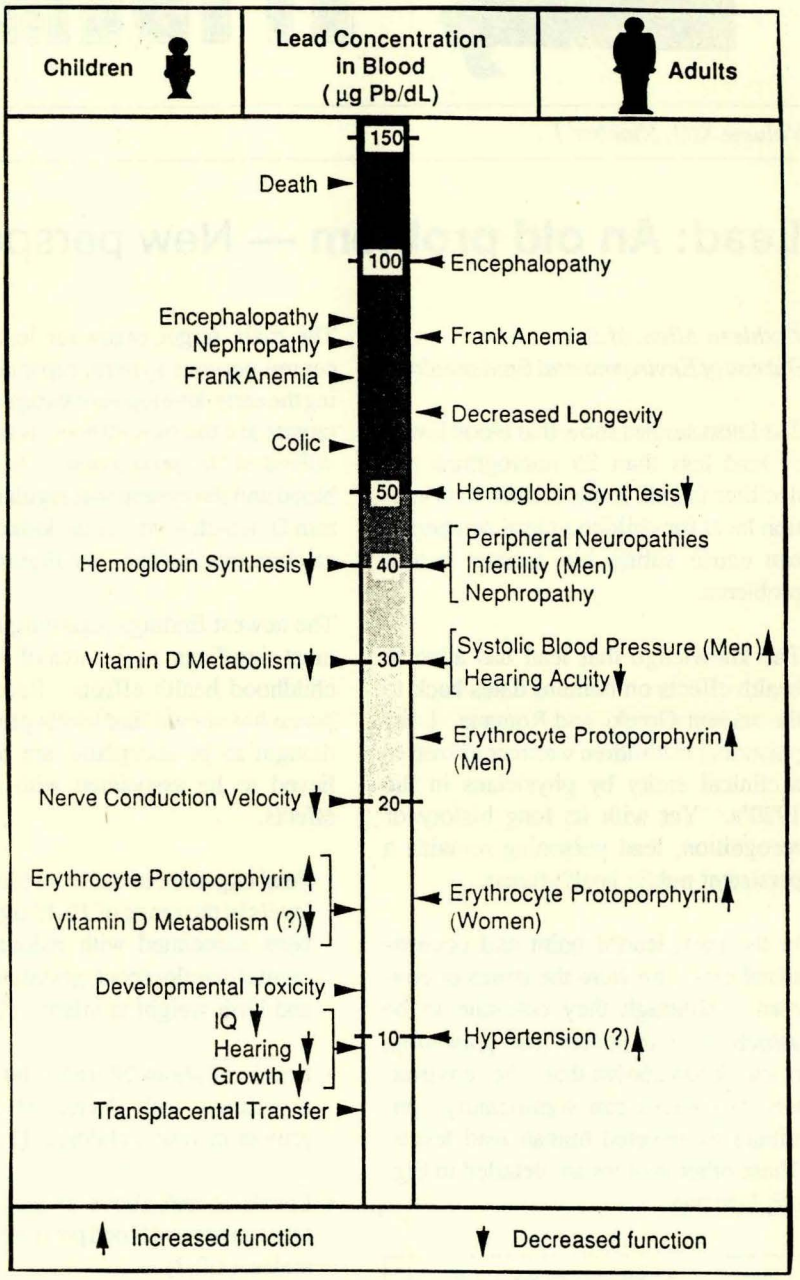

Figure 2. Effects of inorganic lead on children and adults—lowest observable adverse effect levels. Adapted from reference 1.

lead-related occupations or persons who participate in lead-related hobbies. (3)

The Missouri Department of Health is applying for a CDC Childhood Lead Poisoning Prevention Grant which would enhance existing childhood lead programs and establish lead screening in areas which have no programs. This funding would also help establish elevated blood lead as a reportable illness, and allow the Department of Health to monitor the extent of the problem in our state.

A study to evaluate the lead levels of residents in the Tri-State Mining District of southwest Missouri has been initiated. The department is also involved in designing a pilot program for educating health professionals about lead-related health effects in this same region. Both of these studies are being done in cooperation with the Agency for Toxic Substances and Disease Registry (ATSDR), a unit of the U.S. Public Health Service.

For more information concerning lead poisoning, contact the Bureau of Environmental Epidemiology or Dr. Patrick Phillips at (314) 751-6102 or (800) 302-7245.

REFERENCES

1. Agency for Toxic Substances and Disease Registry, Public Health Service, U.S. Dept of Health and Human Services, *Toxicological Profile for Lead* , June 1990
2. ATSDR, PHS, US DHHS, *The Nature and Extent of Lead Poisoning in Children in the United States: A Report to Congress*, July 1988
3. CDC, PHS, US DHHS, *Preventing Lead Poisoning in Young Children*, January 1985

A self-instructional Environmental Medicine Case Study for Lead Toxicity is available from ATSDR. It is designed for the primary care provider and may be used to obtain one hour CME credit or 0.1 hour CEU.

Contact:
Continuing Education Coordinator
Agency for Toxic Substances and Disease Registry
Division of Health Education,
E33, 1600 Clifton Road,
Atlanta, GA 30333

The Occurrence of Nitrates in Missouri

Randall Maley
Bureau of Environmental Epidemiology

Infants fed baby formula prepared with water containing high level of nitrates can develop a condition known as methemoglobinemia. Enzymes in the intestinal tract of the infant reduce the nitrate to nitrite, which is then absorbed and combines with hemoglobin in the blood, reducing its capacity to carry oxygen. The resulting cyanosis gives the illness its common name - "blue-baby disease". While treatment with methylene blue quickly reverses the condition, deaths were once quite common.

Nitrates have been known to cause methemoglobinemia since 1945. By the early 1950's it became apparent to public and private health-care workers in midwestern states that they had been overlooking a significant contributor to infant mortality. A study performed in Minnesota between 1947 and 1949 confirmed an average of 60 cases and 6 deaths per year in that state alone.

While cases of methemoglobinemia are much less common now, a death in South Dakota in 1986 reminded public health officials that the problem is still present. The decrease in the occurrence of methemoglobinemia has little to do with the quality of well water. While properly drilled wells should yield water low in nitrates, most wells in Missouri and other midwestern states were not properly constructed. Missouri still has significant numbers of hundred-year-old, hand-dug, rock-lined wells being utilized as primary drinking water sources. The primary reasons for the decline in the methemoglobinemia are the popularity of ready-to-feed formula and the recognition of health-care providers that well water should be analyzed for nitrates before placing infants on powdered formula.

Nitrates are one of the most common well contaminants in Missouri. Samples from 863 private wells were analyzed by the Missouri Public Health Laboratory during 1990. One hundred sixteen (13.4%) of these samples contained nitrates above the public drinking water standard of 10 parts per million (ppm). While the overall rate for the state was only 13.4%, 11 counties had rates above 40%. The area with the highest incidence of high nitrate wells was the Northwest District, where 62 (35.4%) of 175 wells tested exceeded the public drinking water standard. Figure 1 shows the percentage of wells sampled in 1989 and 1990 that were above the public drinking water standard for nitrates and clearly illustrates the regional nature of nitrate contamination in Missouri. Table 1 shows the total for each district for 1989 and 1990.

The common sources of nitrates in well water are improperly constructed on-site sewage systems, feedlots and nitrate fertilizer. Contamination from these sources infiltrate wells and pollute the water. Many factors affect the percentage of wells that are contaminated in a given area. Obviously, the more agriculture in an area the more potential sources of contamination. Other factors include topography, depth to groundwa-

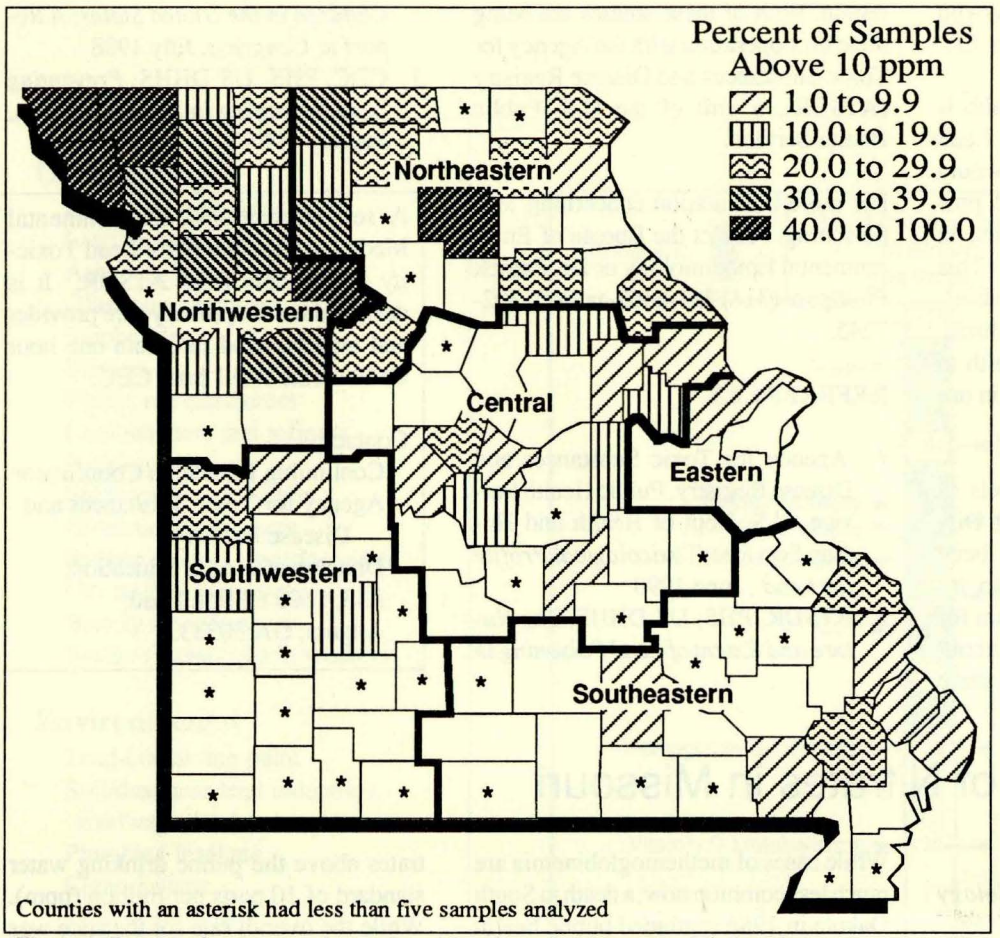

Figure 1. Results of water samples analyzed for nitrates at the state public health laboratory, by county, 1989-90

ter and soil type. For an individual well, factors such as well depth, well construction and distance to pollution sources are important. The Bureau of Environmental Epidemiology is currently performing studies to help determine the factors most commonly associated with nitrate contamination in Missouri.

Private well users who plan to have children should have their water tested for nitrates. If the well is found to be contaminated, there are several options open to the parents. They can use ready-to-feed formula and avoid using the well water, install a reverse-osmosis unit or other treatment system that removes nitrates from water or obtain drinking water from an uncontaminated source. Breast-feeding has rarely been associated with methemoglobinemia, but is not a satisfactory solution since nitrites can be passed to the infant through the breast milk. Since nitrates are heat stable, boiling well water will not remove them. In fact, it increases their concentration since boiling reduces the amount of water but leaves the nitrates unchanged.

Methemoglobinemia is limited to infants under one year of age. Most cases, in fact, occur in infants less than four months old. While there is currently some debate as to whether nitrates are capable of inducing other health problems, adults and children over a year old are not at risk from methemoglobinemia.

TABLE 1. Results of water samples analyzed for nitrates at the state public health laboratory, by Department of Health districts, 1989-90

	1989			1990		
District*	Number of Samples	Number >10ppm	Percent >10ppm	Number of Samples	Number >10ppm	Percent >10ppm
Central	173	17	9.8	274	14	5.1
Eastern	63	0	0	39	0	0
Northeastern	131	27	20.6	92	27	29.3
Northwestern	273	87	31.9	182	63	34.1
Southeastern	164	7	4.3	197	5	2.5
Southwestern	74	0	0	81	7	8.6

*County level data available upon request from the Bureau of Environmental Epidemiology.

HAEMOPHILUS b CONJUGATE VACCINE (HbCV) RECOMMENDATIONS

Adapted from the Morbidity and Mortality Weekly Report, January 11, 1991/Vol. 40/No. RR-1

1. The Immunization Practices Advisory Committee (ACIP) and the Missouri Department of Health (DOH) recommend that all children receive one of the HbCVs licensed for infant use [HbOC (HibTITER) or PRP-OMP (PedvaxHIB)], beginning routinely at 2 months of age (Table 1). Administration of the vaccine series may be initiated as early as age 6 weeks.

TABLE 1. Recommended HbCV routine vaccination schedule

Vaccine	2 Months	4 Months	6 Months	12 Months	15 Months
HbOC (HibTITER)	dose 1	dose 2	dose 3		booster
PRP-OMP (PedvaxHIB)	dose 1	dose 2		booster	

TABLE 2. Detailed vaccination schedule for Haemophilus b conjugate vaccines

Vaccine	Age at First dose (months)	Primary series	Booster
HbOC	2-6	3 doses, 2 mo. apart	15 mo.*
(HibTITER)	7-11	2 doses, 2 mo. apart	15 mo.*
(Lederle-Praxis)	12-14	1 dose	15 mo.*
	15-59	1 dose	-
PRP-OMP	2-6	2 doses, 2 mo. apart	12 mo.*
(PedvaxHIB)	7-11	2 doses, 2 mo. apart	15 mo.*
(Merck Sharp	12-14	1 dose	15 mo.*
and Dohme)	15-59	1 dose	-
PRP-D	15-59	1 dose	-
(ProHIBit)			
(Connaught)			

*At least 2 months after previous dose.

2. If HbOC is to be used, previously unvaccinated infants 2-6 months of age should receive three doses given at least 2 months apart. Unvaccinated infants 7-11 months of age should receive two doses of HbOC, given at least 2 months apart, before they are 15 months old (Table 2). Unvaccinated children 12-14 months of age should receive a single dose of vaccine before they are 15 months of age. **An additional dose of HbOC should be given to all children at 15 months of age, or as soon as possible thereafter, at an interval not less than 2 months after the previous dose.** The other two HbCVs licensed for use at 15 months of age may be used for this dose, but there are no data demonstrating that a booster response will occur. An interval as short as 1 month between doses is acceptable but not optimal.

3. If PRP-OMP is to be used, previously unvaccinated infants 2-6 months of age should receive two doses 2 months apart and a booster dose at 12 months of age. Children 7-11 months of age not previously vaccinated should receive two doses 2 months apart and a booster dose at 15 months of age (or as soon as possible thereafter), not less than 2 months after the previous dose. Children 12-14 months of age not previously vaccinated should receive a single dose and a booster dose at 15 months of age (or as soon as possible thereafter), not less than 2 months after the previous dose. The other two HbCVs licensed for use at 15 months of age may be used for this dose, but there are no data demonstrating that a booster response will occur. An interval as short as 1 month between doses is acceptable but not optimal.

4. Unvaccinated children 15-59 months of age may be given any one of the three HbCVs licensed for this age group.

5. Ideally, the same HbCV should be used throughout the entire vaccination series (according to the schedule outlined in Table 2). No data exist regarding the interchangeability of different HbCVs with respect to safety, immunogenicity, or efficacy. However, situations will arise in which the vaccine provider does not know which type of HbCV the child to be vaccinated had previously received. Under these circumstances, it is prudent for vaccine providers to ensure that at a minimum an infant 2-6 months of age receives a primary series of three doses of HbCV. These recommendations may change as data become available regarding the response to different HbCVs in a primary series.

6. Children <24 months of age who have had invasive Hib disease should still receive HbCV, since many children of that age fail to develop adequate immunity following natural diseases. The HbCV series can be initiated (or continued) at the time of hospital discharge.

7. Chemoprophylaxis of household or day-care classroom contacts of children with Hib disease should be directed at both vaccinated and unvaccinated contacts because immune individuals may asymptomatically carry and transmit the organism. Because of the time required to generate an immunologic response, vaccination following exposure should not be used to prevent secondary cases. However, the ACIP strongly supports extensive use of HbCV for infants attending day-care facilities; that action should substantially decrease the occurrence of primary cases of Hib disease in day-care facilities. If every child in a household or day-care classroom has been fully vaccinated, chemoprophylaxis is unnecessary.

8. HbCV may be given simultaneously with diphtheria and tetanus toxoids and pertussis vaccine adsorbed (DTP); combined measles, mumps, rubella vaccine (MMR); oral poliovirus vaccine (OPV); or inactivated poliovirus vaccine (IPV). Any of the vaccines may be injected in the thigh, and two injections may be given in the same deltoid. All licensed HbCV should be administered by the intramuscular route. There are no known contraindications to simultaneous administration of any HbCV with either pneumococcal or meningococcal vaccine.

9. No efficacy data are available on which to base a recommendation concerning use of HbCV for older children and adults with the chronic conditions associated with an increased risk of Hib disease. Studies suggest, however, good immunogenicity in patients with sickle cell disease, leukemia , patients who have had splenectomies or who have HIV infection and administering HbCV to these patients is not contraindicated.

Imm.P. 19-Rev.3/91

MISSOURI DEPARTMENT OF HEALTH IMMUNIZATION SCHEDULE - MARCH 1991

TABLE I - FOR CHILDREN STARTING THE IMMUNIZATION SERIES AT THE RECOMMENDED AGE OF TWO MONTHS

Age at First Visit	Vaccines Given at First Visit	Age and Vaccines for Subsequent Visits				
		4 Months of Age	6 Months of Age	15 Months of Age	4-6 Years of Age (At or Before School Entry)	14-16 Years of Age (Repeat Every 10 Years)
2 Months of Age	DTP	DTP	DTP	DTP	DTP	Td
	OPV	OPV	-	OPV	OPV	-
	HbCV [1]	HbCV [1]	HbCV [1]	HbCV Booster [2]	-	-
	-	-	-	MMR	MMR	-

TABLE II - FOR CHILDREN STARTING THE IMMUNIZATION SERIES OLDER THAN THE RECOMMENDED AGE OF TWO MONTHS

Age at First Visit	Vaccines Given at First Visit	Timing or Age and Vaccines for Subsequent Visits				
		2 Months After First Dose	2 Months After Previous Dose	6-12 Months After Previous Dose	4-6 Years of Age (At or Before School Entry)	14-16 Years of Age (Repeat Every 10 Years)
3 - 6 Months of Age	DTP	DTP	DTP	DTP	DTP	Td
	OPV	OPV	-	OPV	OPV	-
	HbCV [1]	HbCV [1]	HbCV [1]	HbCV Booster at 15 mos [2]	-	-
	-	-	-	MMR at 15 mos	MMR	-
7 - 11 Months of Age	DTP	DTP	DTP	DTP	DTP	Td
	OPV	OPV	-	OPV	OPV	-
	HbCV [1]	HbCV [1]	HbCV Booster at 15 mos [2]		-	-
	-	-	MMR at 15 mos		MMR	-
12 - 14 Months of Age	DTP	DTP	DTP	DTP	DTP	Td
	OPV	OPV	-	OPV	OPV	-
	HbCV [1]	HbCV Booster at 15 or 16 mos [2, 3]		-	-	-
	-	MMR at 15 mos		-	MMR	-
15 - 59 Months of Age	DTP	DTP	DTP	DTP	DTP [4]	Td
	OPV	OPV	-	OPV	OPV [4]	-
	HbCV [2]	-	-	-	-	-
	MMR	MMR at or before school entry [5]				-
5 - 6 Years of Age	DTP	DTP or Td [6]	DTP or Td [6]	DTP or Td [6]	-	Td
	OPV	OPV	-	OPV	-	-
	MMR	MMR [5]	-	-	-	-
7 Years of Age and Older	Td	Td	-	Td	-	Td
	OPV [7]	OPV [7]	-	OPV [7]	-	-
	MMR [8]	MMR [5, 8, 9]	-	-	-	-

1. A child less than 15 months of age should receive the same type of HbCV throughout the primary series. HibTITER (HbOC) is the only HbCV supplied by DOH at this time for children less than 15 months of age. PedvaxHIB (PRP-OMP), the other HbCV currently licensed for children less than 15 months of age, is recommended at 2, 4 & 12 months of age.
2. Any licensed HbCV may be given at 15 months of age. Users of DOH-supplied HbCV are encouraged to administer ProHIBit (PRP-D), and not HibTITER (HbOC), to children 15 through 59 months of age until the DOH supply of ProHIBit (PRP-D) is gone.
3. This dose must be given at least 2 months after previous HbCV.
4. The 5th DTP and the 4th OPV are not necessary if the 4th DTP and the 3rd OPV were administered on or after the 4th birthday.
5. This dose must be given at least one month after previous MMR.
6. DTP and DT are for children less than 7 years of age and Td is for individuals 7 years of age and older.
7. OPV is not routinely recommended for individuals 18 years of age and older.
8. MMR is not routinely recommended for individuals born before 1957.
9. The need for this second MMR is dependent upon the individual's age and/or grade in school.

NOTE: Intervals between doses that are longer than those recommended do not lead to a reduction in final antibody levels. Therefore, it is not necessary to restart an interrupted series of an immunobiologic or to add extra doses. In contrast, giving doses of a vaccine or toxoid at less than recommended intervals may lessen the antibody response and therefore should be avoided.
MMR, DTP, OPV and HbCV should be administered simultaneously at separate sites to all children 15 months of age and older who are eligible to receive these vaccines.

Pesticide Monitoring Update

Randall Maley
Bureau of Environmental Epidemiology

The Bureau of Environmental Epidemiology (BEE) has been cooperating with the United States Geological Survey (USGS) since 1986 on a joint project to assess groundwater contamination from pesticides in vulnerable areas of the state. Studies have been conducted in southeast Missouri, the Missouri River flood plain between St. Joseph and the Iowa line and in west-central Missouri. In September, 1990, BEE was awarded a grant by EPA to expand the program. In federal FY91, BEE will collect water samples from more than 230 wells in Bates, Caldwell, Cass, Clinton, Daviess, Gentry, Nodaway and Vernon Counties.

The sampling in northwest Missouri will be for the purpose of determining the occurrence of pesticides in private wells in the five northwestern counties listed. The 1991 sampling in west-central Missouri will focus on determining the sources and mechanisms by which shallow wells become contaminated with pesticides and nitrates. This sampling will include state-of-the-art technology that has only become available in the past two years. Wells that have nitrate levels above the public drinking water standard will be analyzed for nitrogen isotopes. The resulting N-14: N-15 ratio will be used to determine if the nitrates present are from nitrate fertilizer or from an organic source. By combining this test with a test for optical brighteners (an additive to soaps and detergents), researchers will be able to tell whether the nitrates present are from feedlots, nitrate fertilizer or from sewage disposal systems. These are believed to be the three most common sources of nitrate contamination.

Another new analysis will be performed on all wells found to be contaminated with pesticides. By determining the tritium content of the water, researchers will be able to tell how long the water has been in the ground. If the water has been in the ground for decades, and is contaminated with pesticides, it is evidence that the pesticides polluted the water many years after it had entered the ground, which would indicate that the contamination occurred at or near the wellhead.

If the contaminated water is relatively young as reflected by the tritium content it cannot be determined whether the contamination occurred at the wellhead or elsewhere.

All wells will be screened using new immuno-assay tests. BEE has used the Immuno-triazine[R] screen since it became available two years ago and has had excellent results. We will begin using a new immuno-alachlor screen in northwest Missouri to test its effectiveness. These screening tests are important tools which can be used to expand research projects. Using screens for two common classes of pesticides, wells can be screened for about $25 each. Samples from wells that test positive will be sent to a laboratory for confirmation. This is considerably less expensive than having all samples analyzed initially at a laboratory since analysis at an approved laboratory costs at least $100 per sample.

The program being conducted by BEE and the USGS will assist the Department of Agriculture in developing a statewide pesticide plan. As we gain information on the presence and persistence of pesticides in Missouri's groundwater, we will be better able to protect this priceless natural resource.

Public Health Laboratory Report

Newborn Screening — Hypothyroidism, Phenylketonuria, Galactosemia and Hemoglobinopathies

James Baumgartner, BS, MBA, Chief, Metabolic Disease Unit

	Sep 90	Oct 90	Total YTD
Specimens Tested	8,302	10,283	88,741
Initial (percent)	75.3	73.2	68,508
Repeat (percent)	24.7	26.8	20,233
Specimens: Unsatisfactory	148	251	1,860
HT Borderline	151	385	1,085
HT Presumptive	4	17	70
PKU Borderline	6	4	162
PKU Presumptive Positive		1	8
GAL Borderline	9	7	104
GAL Presumptive Positive		1	8
FAS (Sickle cell trait)	93	114	760
FAC (Hb C trait)	34	25	205
FAX (Hb variant)	14	19	89
FS (Sickle cell disease)		4	25
FSC (SC disease)	3		10
FC (Hb C disease)			3

HT = Hypothyroidism, PKU = Phenylketonuria, GAL = Galactosemia, Hb = Hemoglobin, SC = Sickle cell, YTD = Year to Date

TB Awareness Fortnight — April 8-19, 1991

Vic Tomlinson
Bureau of Tuberculosis Control

The sixth annual Tuberculosis Awareness Fortnight campaign is scheduled in Missouri from April 8-19, 1991. During this period of time special activities are planned to raise levels of awareness concerning tuberculosis. Some of the activities during this campaign will include seminars on tuberculosis, grand rounds presentations in medical schools and hospitals, articles on tuberculosis in a number of newspapers and newsletters and ceremonies for the issuance of proclamations which underscore these educational efforts.

In the St. Louis area, the focal point of this year's awareness activities will be an all day symposium on tuberculosis with the theme of "TB, the Disease that Refuses to Die". This year's featured speakers include Dr. Dixie E. Snider, Jr., Director of the Division of Tuberculosis Elimination at the Centers for Disease Control (CDC) in Atlanta and Ms. Carol Pozsik, R.N., Director of the Tuberculosis Control Division of the South Carolina Department of Health. Dr. Snider will discuss the TB/HIV connection and short course chemotherapy for tuberculosis. Ms. Pozsik will discuss treatment compliance and the use of incentives for tuberculosis patients. The symposium will be held at the St. Louis Metropolitan Medical Society on April 18 from 8:00 a.m. to 4:30 p.m.

The awareness activities in Kansas City will include grand rounds on April 12 at the University of Missouri School of Medicine-Kansas City. In addition, a CDC sponsored course entitled "Tuberculosis Medical Orientation" will be provided on April 17 at the Kansas City Health Department.

Application has been made for Continuing Medical Education credits for both of these courses.

For additional information concerning Tuberculosis Awareness Fortnight activities, please contact the Bureau of Tuberculosis Control at (314) 751-6122, American Lung Association of Eastern Missouri at (314) 645-5505, or the American Lung Association of Western Missouri at (816) 842-5242.

Reporting Tuberculosis Infection

H. Denny Donnell, Jr., M.D., M.P.H.
Section of Disease Prevention

Vic Tomlinson
Bureau of Tuberculosis Control

The Department of Health has filed a rule change to make tuberculosis infection a reportable condition in Missouri. This change to 19 CSR 20-20.020 is effective as of March 14, 1991.

The reporting of infection is being undertaken in addition to our continued reporting of tuberculosis disease. Monitoring and follow-up of tuberculosis infection will assist in preventing future cases of tuberculosis and eliminating this disease by the year 2010. (See March, April, May 1990 issue of the *Missouri Epidemiologist* for discussion of TB elimination by the year 2010)

A reporting card will be prepared. The same card that is utilized for reporting tuberculosis disease (i.e.Individual Tuberculosis Report/TBC-3) can be utilized, in the interim, for reporting tuberculosis infection. Some of the information that will be helpful includes the type of skin test, the results of the skin test in millimeters of induration, the results of the chest x-ray, medication that the patient is receiving for the infection and the reason that the patient received the skin test.

The recent outbreak of tuberculosis in 1990 in an elementary school in St. Louis County could have been averted if the source case had received treatment for tuberculosis infection when it was first detected. Unfortunately, this patient was not preventively treated. The patient did develop the disease and, as a result, 51.3% (176/343) of the students at the school were infected, 26.5% (13/49) of the staff were infected and 32 of the students developed tuberculosis disease.

Rapid follow-up and education regarding the guidelines for treating tuberculosis infection can make a difference in preventing tuberculosis disease cases.

Your cooperation and support in implementing the reporting of tuberculosis infection will be greatly appreciated. If you have any questions concerning this new process, call the Bureau of Tuberculosis Control at (314) 751-6122. Also, you should send your reporting information to the local health department.

From New Editorial Staff — H. Denny Donnell, Jr., M.D., M.P.H. and Diane C. Rackers

Statistical morbidity data for November and December representing 1990 cumulative data will appear in the next issue.

If you have not returned the readership survey from the November-December newsletter, please take time to do so now. We always welcome your comments regarding topics covered in past issues or that you would like addressed in future issues. This publication is not copyrighted and any and all parts may be reproduced without permission. Acknowledgement of the source would be appreciated.

Influenza Isolates 1990/91 Season Predominately type B

Irene Donelon
Bureau of Communicable Disease Control

As of March 5 1991, 48 laboratory confirmed cases of influenza have been reported in Missouri. Forty-five are type B with 18 subtyped as B/Yamagata, and three are type A with one subtyped as A(H1N1). The first case was reported on December 19, 1990 from the City of St. Louis in a 2 year old child. By the end of February in 1990, 248 laboratory confirmed cases had been reported. All were identified as type A (Figure 1). Reports of influenza-like illness in the state are down considerably from last year and well below the 1986-1990 average (Figure 2).

Amantadine hydrochloride is an antiviral agent with specific activity against influenza A viruses. It is not effective against type B influenza.

The Bureau of Immunization purchased and distributed over 157,000 doses of influenza vaccine to local county health units during October, 1990.

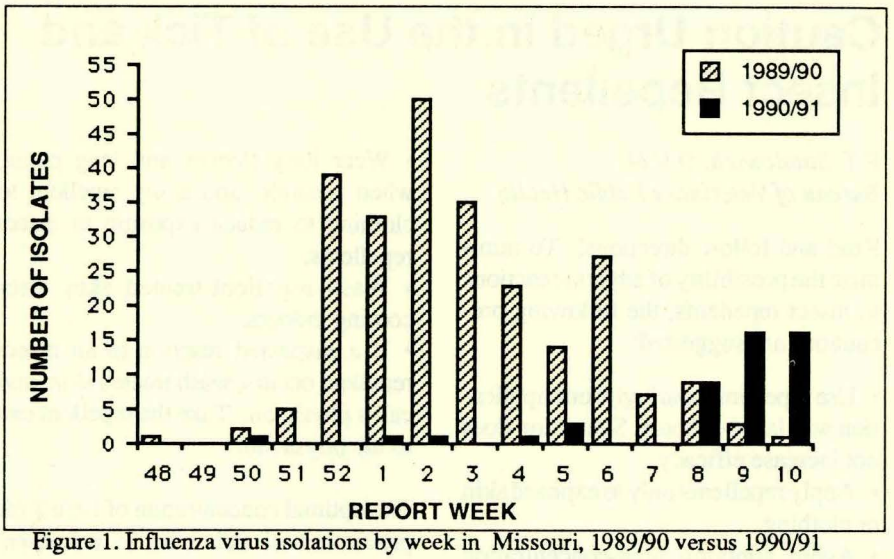

Figure 1. Influenza virus isolations by week in Missouri, 1989/90 versus 1990/91

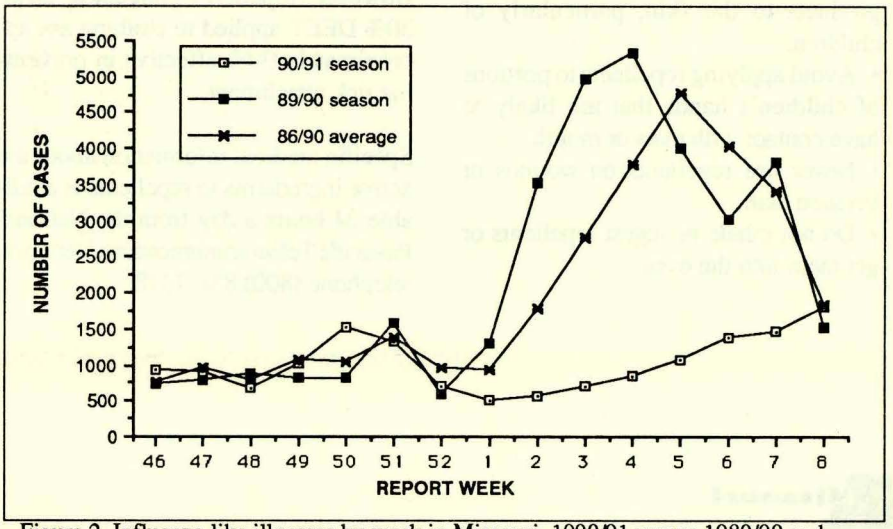

Figure 2. Influenza-like illnesses by week in Missouri, 1990/91 versus 1989/90 and 1986/90 average

Nationwide, all but 6 states have reported isolates of influenza B. Influenza type B accounts for 97% of all isolates reported. Sporadic isolates of influenza A(H1N1) and A(H3N2) account for the remaining 3% of isolates. All isolates characterized to date resemble the strain included in this year's influenza vaccine.

Two-Dose Measles Vaccine Requirement for Kindergarten and First Grade Students for the 1991-92 School Year

The Missouri School Immunization Rule (19 CSR 20-28.010 Immunization Requirements for School Children) has been revised and goes into effect March 14, 1991. Beginning with the 1991-92 school year, all students in kindergarten and first grade will be required to have documentation of having received **two** doses of measles vaccine on or after the **first** birthday.

This revision does **not** mean that the recommended routine age for MMR vaccine administration has been lowered to one year of age. The recommended age for the first routine dose of MMR vaccine is still 15 months of age; however, if for some reason a child does receive a dose of MMR vaccine on or after the first birthday, but before 15 months of age, that dose will count as one of the two required measles vaccine doses for school attendance. The recommended age for the second routine dose of MMR vaccine is 4-6 years of age prior to school entry, at the same time as the other two preschool immunizations, the fifth DTP and the fourth OPV. See Immunization Schedule on page 6 of this issue.

Caution Urged in the Use of Tick and Insect Repellents

F.T. Satalowich, D.V.M.
Bureau of Veterinary Public Health

Read and follow directions! To minimize the possibility of adverse reactions to insect repellents, the following precautions are suggested:

- Use repellents sparingly; one application will last 4-8 hours. Saturation does not increase efficacy.
- Apply repellents only to exposed skin or clothing.
- Avoid applying high-concentration products to the skin, particularly of children.
- Avoid applying repellents to portions of children's hands that are likely to have contact with eyes or mouth.
- Never use repellents on wounds or irritated skin.
- Do not inhale or ingest repellents or get them into the eyes.
- Wear long sleeves and long pants, when possible, and apply repellent to clothing to reduce exposure to insect repellents.
- Wash repellent-treated skin after coming indoors.
- If a suspected reaction to an insect repellent occurs, wash treated skin, and call a physician. Take the repellent can to the physician.

The optimal concentration of DEET for prevention of tick bites is unknown. However, repellents containing 20%-30% DEET applied to clothing are approximately 90% effective in preventing tick attachment.

Specific medical information about the active ingredients in repellents is available 24 hours a day from the National Pesticide Telecommunications Network, telephone (800) 858-7378.

TEACH CHILDREN ABOUT HANDWASHING AND CLEANLINESS

A 16 minute videotape entitled **"ABCs of clean: A handwashing and cleanliness program for Head Start and early childhood programs"** is available for loan through the Missouri Department of Health.

The videotape examines the manifestations of infectious disease among children in group settings and offers guidelines for disease prevention that can be incorporated into the daily routine. It is targeted to day care and preschool personnel.

Contact:
Missouri Department of Health
Films and Literature
PO Box 570
Jefferson City, MO 65102
Telephone: (314) 751-6048

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Missouri EPIDEMIOLOGIST

Volume XIII, Number 2 *March -April 1991*

Level II Intervention for Persons Infected with Human Immunodeficiency Virus (HIV)

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Division of Environmental Health and Epidemiology

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In early 1990, the Department of Health (DOH) piloted a program designed to deal with complaints received against persons with HIV who continue to practice behaviors that place others at risk of infection. This program, entitled Level II Intervention, provides the needed step between routine post-test consultation (Level I Intervention) and the prosecution called for in statute (Level III Intervention). This program, the only one of its type nationwide, represents one model which is an effort to balance the responsibility of the state to protect the public health with the need to protect individual civil liberties.

Missouri statute[1] makes it a felony offense for persons infected with HIV to knowingly engage in behaviors that may transmit HIV. This statute further calls for the DOH to file a complaint with the appropriate local prosecuting attorney against individuals who violate this section by continuing to expose others to the risk of HIV infection. As of February, 1991, Missouri was one of 22 states that have made knowingly transmitting HIV or knowingly exposing another to HIV infection a crime[2]. In the future, in order for a state to receive federal funds for HIV counseling and testing under the Ryan White Comprehensive Emergency Act of 1990, the state will be required to have criminal laws to prosecute persons with HIV who knowingly expose others to the risk of transmission.

Counseling to accompany HIV testing of persons who are infected or at risk for acquiring HIV infection has been the standard of care for several years[3-6]. Post-test consultation[7] to accompany the giving of the test results to an individual with a positive HIV antibody test routinely includes a discussion of behavior changes which must occur in order to prevent further transmission of HIV: discontinuation of needle-sharing and unprotected sex, etc.

Unfortunately, by the end of 1989, the DOH had received numerous complaints from individuals who reported that they had engaged in sexual intercourse or needle sharing with a partner who had concealed his/her HIV-infected status. Program staff from AIDS Prevention and Sexually Transmitted Diseases developed a system to systematically identify individuals who may be continuing to expose others, to provide them with a second, targeted informational counseling session and to provide any available referrals to assist persons in efforts to modify their behavior.

Performed by skilled Disease Intervention Specialists (DIS), the Level II Intervention program: 1) identifies probable violators through disease surveillance (e.g. HIV and sexually transmitted disease reporting, partner elicitation); 2) receives and investigates complaints against individuals; 3) follows up with potential violators; and 4) assesses the potential violators' understanding of HIV infection, provides in-depth discussion of the statute, counsels on prevention methods, and refers to case management, peer support groups, substance abuse treatment, medical and behavior modification therapy.

The associated policies and procedures were developed in consultation with local and state legal, medical and public health professionals, the health directors of Missouri's three largest cities, staff from the metropolitan AIDS programs and the AIDS Advisory Council. To conduct the program, the Bureau of AIDS Prevention, through memoranda of understanding with the Bureau of Sexually Transmitted Diseases, funds three specially trained DIS, one in St. Louis, one in Kansas City and one in Jefferson City.

The DOH initiates Level II Intervention on confirmed HIV infected individuals who are believed to be continuing to

Inside this Issue...

practice behavior consistent with the known means of transmission of HIV.

Examples of initiation of Level II Intervention include, but are not limited to:

Personal Complaint: A person who feels he/she has been exposed by an HIV infected individual may file a complaint directly with the DOH. Complaints are accepted only from the individual exposed; no third party complaints are investigated. The DOH will accept a personal complaint if the following information is obtained:

1) name and locating information of person filing the complaint.
2) name and locating information of the person the complaint is being filed against.
3) actual complaint including specific details. Complaints may be made by telephone if the above information is obtained.

Private provider: Physician, nurse, social worker, etc., who learns of persistent high-risk behavior by a client and reports this directly to the DOH.

STD Clinic: An HIV-infected person returns for treatment of a sexually transmitted disease; this is a strong indication of a failure to modify high-risk behavior. The STD clinic reports to the DOH.

Contact: An HIV-infected person may be named in a partner elicitation interview. The investigator/interviewer would confirm the possible exposure and report this to the DOH.

Donor Bank: An HIV-infected individual may attempt to donate blood or other tissue. The blood or tissue bank may report this to the DOH.

The DOH confirms that the subject of the complaint has been reported as HIV seropositive and documents the date and location of the test and the source of the post-test consultation. Cases are then assigned to the local Level II Specialist for follow up. The Level II Specialist may then contact the testing site to confirm that post-test consultation did occur. Contact is then made with the subject of the complaint and the Level II session is scheduled.

The Level II Intervention information and counseling session is structured and is conducted in person by the Level II Specialist. The content of the interview and the responses of the client are documented on standardized forms. Content includes an explanation of:

- modes of transmission of HIV and an assessment of the client's knowledge of these modes;
- the need and suggestions for behavior modification (abstinence, discontinuing needle sharing, safer sex practices, etc.);
- the proper use of condoms;
- the need to notify future sex and/or needle-sharing partners of HIV status; the need to notify health care providers of HIV status before services are received;
- the need to abstain from donating or selling blood, plasma, body organs, tissue or sperm;
- the need to avoid pregnancy or causing pregnancy; the need to enroll in a family planning program;
- the potential consequences of failure to modify behavior thereby exposing another person and creating the potential for prosecution;
- the need for appropriate medical care;
- the basic guidelines on wellness (good nutrition, avoidance of reinfection, exercise, etc.).
- The client is given a handout which summarizes Section 191.677, RSMo (Cum. Supp. 1990) dealing with persistent high-risk behavior. The implications of and penalties for failure to comply are stressed.
- Contact elicitation is performed and the importance of the notification of sex/needle-sharing partners is discussed.
- Referral is made to the Missouri HIV Care Coordination Program. Through the Care Coordination Program, the client may receive:
  1) referral to substance abuse counseling (if applicable);
  2) referral to therapeutic professional counseling to help facilitate behavior modification (if applicable);
  3) referral to peer support groups.

The DOH will file a formal complaint with the local prosecuting attorney under the following circumstances:

- High risk behavior is documented in an individual who has previously received Level II Intervention counseling;
- High risk behavior is documented or a complaint is lodged against an individual who refuses Level II Intervention counseling and has had Level I Intervention counseling consistent with DOH guidelines[3];
- Individuals who specifically threaten high risk behavior and demonstrate total disregard for modifying high risk behavior.

The DOH documents evidence of an individual's failure to modify behavior as outlined above. This evidence is reviewed on a case-by-case basis by DOH epidemiology and legal staff and is shared with representatives of the local health department, each of whom make recommendations regarding the filing of the complaint and working with the prosecuting attorney. The complaint may be filed jointly by DOH and the local health jurisdiction. The final decision regarding filing a complaint against a non-compliant individual rests with the DOH as specified in the statute.

Through February 1991, the Level II Intervention program had initiated in-

vestigations on 116 persons identified as continuing to expose others to HIV. Six of these individuals have been identified again, subsequent to Level II Intervention; they have been referred for prosecution. To date, virtually all persons who have received a Level II session had already received repeated post-test consultations and had clearly understood HIV transmission prior to the Level II interview. All persons referred for prosecution have had repeated post-test consultations.

Level II Intervention offers an additional, targeted consultation to individuals who have experienced difficulty modifying unsafe behavior. The intent of the program is not to bring persons to prosecution; it is a unique program designed to modify behavior and thus prevent the need for prosecution.

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HIV/AIDS Statistics

March 1991

Missouri Department of Health
Bureau of AIDS Prevention

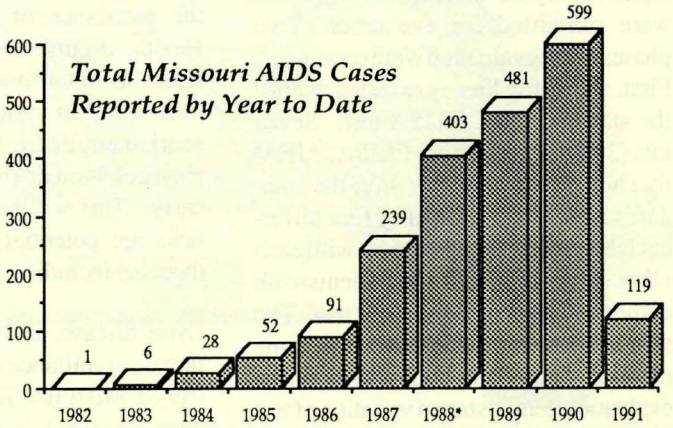
Total AIDS Cases to Date

U.S. AIDS case reports	167,803	
U.S. AIDS deaths reported	106,361	63.4%
Missouri AIDS case reports	2,019	
Missouri AIDS deaths reported	1,073	53.1%
Cases reported in Missouri with official residence elsewhere	292	

Total Diagnostic Tests Performed by State Laboratory

	# of Tests	# Positive	Percent Positive
1986	2,620	306	11.6%
1987	14,508	441	3.0%
1988	39,203	698	1.8%
1989	57,458	872	1.5%
1990	66,853	1,021	1.5%
1991 (to date)	18,200	272	1.5%

Cases Reported in Missouri, 1982-1991



*One 1988 case diagnosed in 1969

Lyme Disease Update

By Michael Fobbs
Bureau of Communicable Disease Control

Lyme disease is caused by a spirochete, *Borrelia burgdorferi*, carried by certain ticks during parts of their life cycle. The primary manifestation is a skin rash called erythema migrans (EM). The disease was first diagnosed in the United States in 1975, though there is evidence of the existence of the bacteria in tick specimens from 1940[1]. The disease has a longer history in Europe where its presentation is more neurologic than rheumatologic which prompts some scientists to postulate the existence of different subspecies of *B. burgdorferi* [2].

The first National Conference on Lyme Disease Testing was held in Dearborn, Michigan on November 1-2, 1990. Co-sponsored by the Association of State and Territorial Public Health Laboratory Directors, the Centers for Disease Control (CDC) and the Food and Drug Administration (FDA), the conference was convened to review the state of serologic testing for *B. burgdorferi* infection and the results of a previous study[3].

Dr. Eric Blank, Director of the Missouri State Public Health Laboratory, was one of the conference moderators. Results of an evaluation of nationally available commercial test kits were reported. Kits from all known United States manufacturers of Lyme disease serology kits were submitted for evaluation. Two phases of the evaluation were conducted. First, all twenty kits were tested against the standard CDC ELISA test. Seven kits (3 ELISA, 1 blot dot ELISA, 3 IFA) that agreed most closely with the standard test were then tested by four different laboratories for agreement with each other using sera from 158 patients with early and late stage Lyme disease[3]. The standard kit was evaluated in the same manner. Data from both phases of the evaluation demonstrated variation of test results between laboratories and test kits, as previously documented in other studies[4].

The data also suggest that the serologic test kits lacked sufficient sensitivity and specificity to be relied upon for diagnosis of *B. burgdorferi* infection. The true sensitivity and specificity of serologic tests cannot be determined until measured against an acceptable standard. At present the only "gold standard" for Lyme disease is isolation of *B. burgdorferi* from clinical specimens which is a difficult procedure. The study concluded that the results of serologic testing must be interpreted with caution. Until the development of tests with greater sensitivity and specificity such as polymerase chain reaction[5]. Lyme disease remains a clinical diagnosis not dependent on laboratory tests.

In the United States, particularly in the Northeast, the primary vector for Lyme disease is the tick *Ixodes dammini*. Other ticks can carry Lyme disease such as *Ixodes pacificus*, *Ixodes scapularis*, *Amblyomma americanum* (Lone Star tick) and *Dermacentor variabilis* (American dog tick). *I. dammini* and the other ticks of the Ixodes complex are considered the most efficient vectors. *A. americanum* and *D. variabilis* are thought to be less efficient vectors[6].

Missouri's experience with Lyme disease has been problematic. The primary vector, *I. dammini*, has not been observed in Missouri. However, Dr. Dorothy Feirs at St. Louis University has conducted studies illustrating that both *A. americanum* and *D. variabilis* in Missouri carry *B. burgdorferi*[6]. The University of Missouri-Columbia, with the assistance of the Department of Health, is currently conducting a field study to determine which species of ticks dwell in various habitats of Missouri, their life cycles, and which of the most common tickborne pathogens they carry. This will help determine which ticks are potential vectors for several diseases including Lyme.

Lyme disease, as defined by CDC's national surveillance case definitions, exists in Missouri. Reported cases have been reviewed in relation to the case definition and for 1990 there were 194 cases of Lyme disease distributed in 38 Missouri counties (Figure 1). Table 1 shows the 1990 cases by age group and sex. The cases were fairly evenly distributed between the sexes.

Lyme disease usually occurrs in stages with specific clinical manifestations defining each stage. Stages may be skipped and/or present out of order, particularly in the later stages.

Early localized infection or stage 1 typicaly develops within three to thirty days after being bitten by a tick and is characterized by EM which may be accompanied by fever, minor constitutional symptoms or regional lymphadenopathy. The rash is a flat erythematous expanding lesion around the tick bite often with central clearing. Satellite lesions similar to the initial EM may occur at locations unrelated to the original tick bite. EM is not always present and should not be confused with an immediate rash that may develop as an allergic reaction to the tick bite.The CDC national surveillance definition requires EM of at least 5 centimeters.

Stage 2 infection, the disseminated infection, presents as a wide spectrum of symptoms. These include a secondary malar rash, migratory pain in joints, tendons, bursae, muscle and bone, brief arthritis attacks, meningitis, cranial neuritis, Bell's palsy, motor or sensory radiculoneuritis, encephalitis, regional or generalized lymphadenopathy, splenomegaly, atrioventricular nodal block, myopericarditis, conjunctivitis,

TABLE 1. Incidence of Lyme disease by age group and sex, Missouri, 1990

	Sex		
Age Group	F	M	Total
0 - 4	1	4	5
5 - 9	5	3	8
10 - 19	5	7	12
20 - 29	12	12	24
30 - 39	19	22	41
40 - 49	24	17	41
50 - 59	13	9	22
60 - 69	14	9	23
70 - 79	4	4	8
80 - 89	4	1	5
Unknown	1	4	5
TOTAL	102	92	194

mild or recurrent hepatitis, nonexudative sore throat, nonproductive cough, microscopic hematuria or proteinuria, severe malaise and fatigue. The most common presentations are seen in the skin, nervous system or musculoskeletal sites.

Late infection, stage 3, is a persistent infection generally seen in the second or third year of illness which may last for months. Symptoms may include acrodermatitis chronica atrophicans, localized scleroma-like lesions, prolonged arthritis attacks, chronic arthritis, peripheral neuropathy, periotitis, chronic encephalomyelitis, spastic paraparesis, ataxic gait, subtle mental disorders, chronic axonal polyradiculopathy, keratitis or fatigue[7].

The recommended treatment for Lyme disease in the early stage of fever and EM is doxycycline 100mg daily or amoxicillin 500mg daily, for ten days to three weeks. Carditis is usually treated with intravenous ceftriaxone 2g daily for fourteen days or penicillin G 20 million units for fourteen days. Arthritis is treated by doxycycline 100mg twice daily for thirty days. Treatment for neurologic manifestations is similar to the treatment for carditis though treatment ranges from fourteen to twenty-one days[8].

Dr. Henry Heimlich has suggested malariotherapy for Lyme disease[9]. He feels that similarities between Lyme disease and syphilis might encourage the use of a therapy that was used at one time for syphilis. CDC has expressed serious reservations about this approach. The approach also carries some risk of acquiring other blood borne illness and the possibility of secondary transmission of malaria. The risk of fatal outcome from malaria is much higher than that from Lyme disease[10].

YEAR	Suspects Reported	Definite	
		Exposed in Missouri	Exposed Elsewhere
1983	1	0	0
1984	10	0	2
1985	6	1	0
1986	5	0	1
1987	30	4	0
1988	38	4	1
1989	213	106	2
1990	420	194	11
TOTAL	723	309	17

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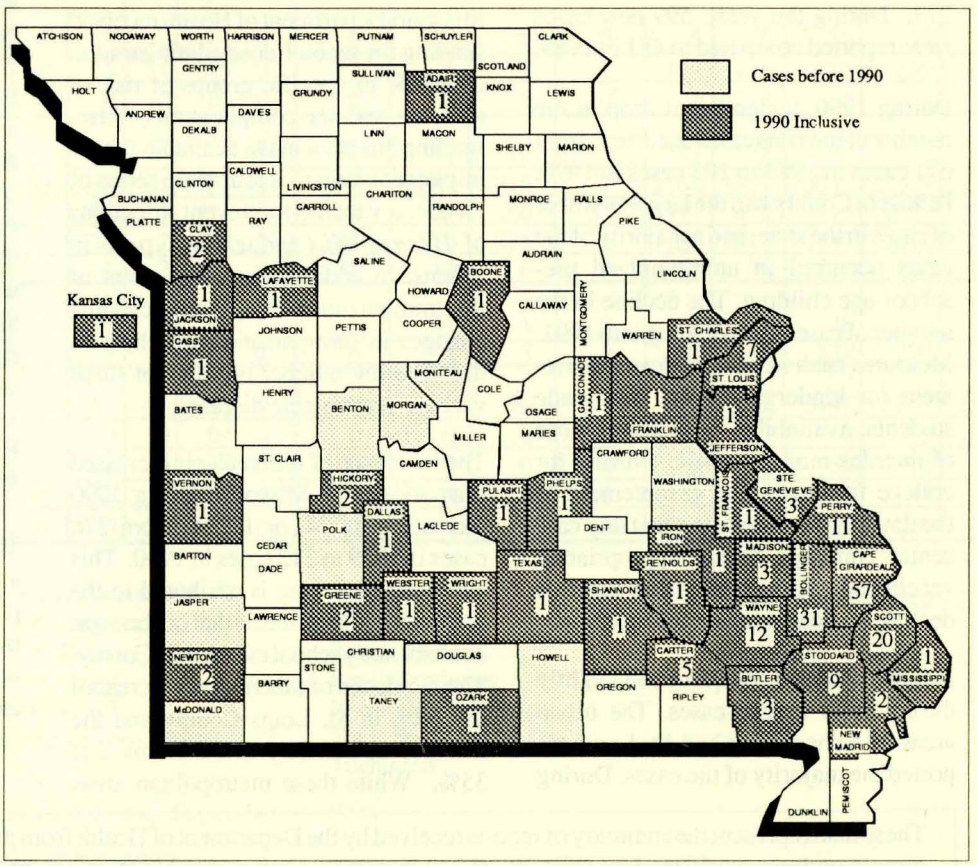


Figure 1. Lyme disease by county of most likely exposure, Missouri, 1983-90

1990 Annual Report on Control of Communicable Disease in Missouri

Among sexually transmitted diseases, gonorrhea decreased in Missouri from 21,053 cases reported in 1989 to 20,012 reported in 1990. This decrease occurred after a two year increase.

The number of reported syphilis cases increased from 388 cases in 1989 to 598 cases in 1990. Early syphilis (primary, secondary and early latent) cases increased from 261 cases reported in 1989 to 438 reported in 1990. This is the third year an increase has been reported since 1981.

Penicillinase producing *Neisseria gonorrhoeae* (PPNG), a resistant strain of gonorrhea, increased from 407 cases in 1989 to 706 cases in 1990. *Chlamydia trachomatis* infections increased from 8,151 cases in 1989 to 11,151 in 1990. The increase in chlamydia is believed to have occurred because of increased screening.

The number of AIDS deaths in 1990 was 277. During the year, 599 new cases were reported compared to 481 in 1989.

During 1990, a significant drop in the number of measles cases occurred; from 671 cases in 1989 to 103 cases in 1990. Pemiscot County had the largest number of cases in the state, and a majority of the cases occurred in unimmunized preschool-age children. The decline in the number of cases is continuing into 1991. Measures such as second-dose requirement for kindergarten and first-grade students, availability of a second dose of measles-mumps-rubella (MMR) for college freshman, and enforcement of the day care law requiring that day care center enrollees be age-appropriately vaccinated will help to ensure that this decline in measles cases will continue.

Incidence of pertussis dropped slightly during 1990 to 116 cases. The urban areas of Kansas City and St. Louis reported the majority of the cases. During the year, the Bureau of Immunization was notified of several laboratory confirmed cases in symptomatic adults, some of whom were related to a larger outbreak in Illinois. A majority of the cases reported in 1990 occurred in unimmunized persons, mostly preschool-age children. Enforcement of the day care law enacted in 1988 requiring age appropriate immunizations may impact on the number of pertussis cases occurring in Missouri.

During 1990, 145 *Haemophilus influenzae* type b cases were identified. The increase from 1989 levels is due to a change in the case definition. *Haemophilus influenzae* type b vaccine is required for day care attendance; therefore as previously mentioned, enforcement of the day care law may help to reduce the incidence of this disease.

Significant changes in immunization recommendations and vaccine administration occurred during 1990. The Missouri Department of Health received funding for second-dose administration of MMR to specific groups at risk of measles and its complications. Also, funding has been made available for the implementation of a four-dose series of HbCV, a vaccine to prevent infections of *Haemophilus influenzae* type b in infants. In addition to enforcement of the immunization law, these schedule changes in immunization will help to decrease the number of cases of these vaccine-preventable diseases.

The incidence of tuberculosis increased dramatically in Missouri during 1990 increasing by 34, or 12.2%, from 278 cases in 1989 to 312 cases in 1990. This substantial increase is attributed to the outbreak of tuberculosis that occurred in an elementary school in St. Louis County. The incidence of tuberculosis increased by 52% in St. Louis County and the increase in the City of St. Louis was 35%. While these metropolitan areas experienced large increases, Kansas City experienced a slight decrease of 3%. Tuberculosis is still a major health concern among a number of population groups including those with HIV infection or AIDS, intravenous drug users, foreign-born individuals from countries with a high prevalence of disease, the elderly, inmates in correctional facilities, the homeless, and minorities. In addition, an increasing number of cases are occurring among younger individuals aged 25 to 44 years.

The number of hepatitis A cases declined in 1990 for the second year in a row, despite a large outbreak in the Belton area in December. There were 619 cases reported in 1990, down 24% from 810 cases in 1989. As in the past several years, most of the cases (69%) occurred in the Kansas City area.

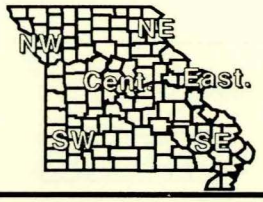
Infections due to *Campylobacter sp.* increased 16%, to 547 cases from 473 reported in 1989. Reports of infections due to *Salmonella sp.* increased 7% to 722 cases in 1990 from 676 in 1989. Shigellosis reports declined for the second year in a row, to 284 cases. This is the lowest number reported since 1986.

Aseptic meningitis reports increased slightly for the second year in a row from 223 cases in 1989 to 246 cases, the highest level since 1983. Meningococcal meningitis increased 48% from 21 cases in 1989 to 31 cases in 1990.

Hepatitis B reports decreased 11% in 1990, to 633 cases from 704 in 1989.

The incidence of animal rabies showed a decrease in 1990 with 30 cases compared to 62 in 1989. Whether this is a true decrease or the result of difficulties in getting specimens to the laboratories cannot be determined.

These data represent the summary of reports received by the Department of Health from the physicians and nurses who report disease under provisions of 19 CSR 20-20.020 Reporting Communicable Diseases. Our thanks to all who cared for these patients and who also took the time to assure that the reports were made to the local health departments.



Missouri Department of Health
Disease Prevention - Communicable Disease Control

BIMONTHLY MORBIDITY REPORT

Reporting Period *
November & December, 1990

	Districts							KANSAS CITY	ST. LOUIS CITY	ST. LOUIS CO.	SPGFLD GREENE CO.	2 MONTH STATE TOTALS		CUMULATIVE		
	** NW	NE	CD	SE	** SW	** ED	*** OTHER					1990	1989	FOR 1990	FOR 1989	5 YR MEDIAN
Vaccine Preventable Dis.																
Chickenpox	249	127	92	249	212	263	0	0	0	12	3	1207	1172	10591	9086	8595
Diphtheria	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Influenza	0	0	0	0	0	0	0	0	1	0	0	1	47	220	293	78
Measles	0	0	0	1	0	0	0	0	0	1	0	2	220	103	671	65
Mumps	1	0	0	2	0	1	0	0	1	1	0	6	25	62	87	38
Pertussis	0	2	2	0	1	0	0	3	0	0	0	8	23	116	141	35
Polio	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Rubella	1	2	0	0	0	0	0	0	0	0	0	3	0	3	4	1
Tetanus	0	0	0	0	0	0	0	0	0	0	0	0	1	0	4	2
Viral Hepatitis																
A	119	4	2	8	5	1	0	41	0	10	0	190	189	619	810	560
B	26	7	20	9	3	4	0	27	12	5	4	117	124	633	704	460
Non A - Non B	4	0	0	1	0	1	0	7	0	1	0	14	9	42	53	46
Unspecified	1	2	0	1	0	0	0	1	0	0	0	5	5	19	13	21
Meningitis																
Aseptic	7	2	3	4	7	1	0	5	0	3	4	36	34	246	223	163
H. influenza	0	1	5	0	1	1	0	1	1	2	2	14	31	88	106	131
Meningococcal	1	0	0	1	0	1	0	0	0	0	0	3	5	31	21	35
Other	1	0	1	1	1	1	0	0	0	0	0	5	14	66	64	64
Enteric Infections																
Campylobacter	8	1	13	5	7	9	0	12	2	12	4	73	40	547	473	304
Salmonella	10	0	13	8	12	8	0	13	13	20	9	106	92	723	676	690
Shigella	4	0	26	2	6	1	0	21	1	2	1	64	43	284	411	411
Typhoid Fever	0	0	0	0	0	0	0	0	0	0	0	0	0	4	2	6
Parasitic Infections																
Amebiasis	1	0	0	0	2	2	0	0	0	0	0	5	6	26	19	27
Giardiasis	19	10	30	12	35	20	0	17	1	22	7	173	148	878	859	654
Toxoplasmosis	1	0	0	0	0	0	0	0	0	0	0	1	0	2	4	19
Sexually Transmitted Dis.																
AIDS	5	1	2	5	3	5	7	40	40	15	4	127	137	599	481	239
Gonorrhea	97	10	93	83	41	19	0	698	1287	395	37	2760	3891	20012	21329	18712
Genital Herpes	42	10	40	28	15	31	0	95	69	160	37	527	478	3310	2283	1364
Nongonoc. urethritis	29	10	55	18	2	0	0	205	566	275	5	1165	1017	7737	6880	7606
Prim. & Sec. syphilis	2	0	3	1	2	0	0	30	13	6	0	57	39	273	163	133
Tuberculosis																
Extrapulmonary	0	0	1	1	0	1	1	2	1	1	0	8	13	40	51	51
Pulmonary	2	3	6	7	3	1	2	6	2	3	2	37	58	272	227	262
Zoonotic																
Animal Bites	163	36	53	52	43	171	0	0	0	90	5	613	833	5442	5687	2406
Psittacosis	0	0	0	0	0	0	0	0	0	0	0	0	3	0	5	2
Rabies (Animal)	0	0	0	2	0	0	0	0	0	0	0	2	6	30	62	59
Rocky Mtn. Sp. Fever	0	0	0	1	1	0	0	0	0	0	0	2	1	36	48	26
Tularemia	1	1	0	0	1	1	0	0	0	0	0	4	7	33	39	39

Low Frequency Diseases

Anthrax
Botulism
Brucellosis - 1
Chancroid
Cholera
Cryptosporidiosis
Encephalitis (infectious) - 1
Encephalitis (viral/arbo-viral)
Granuloma Inguinale
Kawasaki Disease - 3
Legionellosis - 4
Leptospirosis - 2
Lymphogranuloma Venereum - 2
Malaria - 3
Plague
Rabies (human)
Reye's Syndrome
Rheumatic fever, acute
Toxic Shock Syndrome - 1
Trichinosis

Outbreaks

Foodborne/Waterborne - 2
Histoplasmosis
Nosocomial - 5 scabies
Pediculosis - 1
Scabies
Other - 5

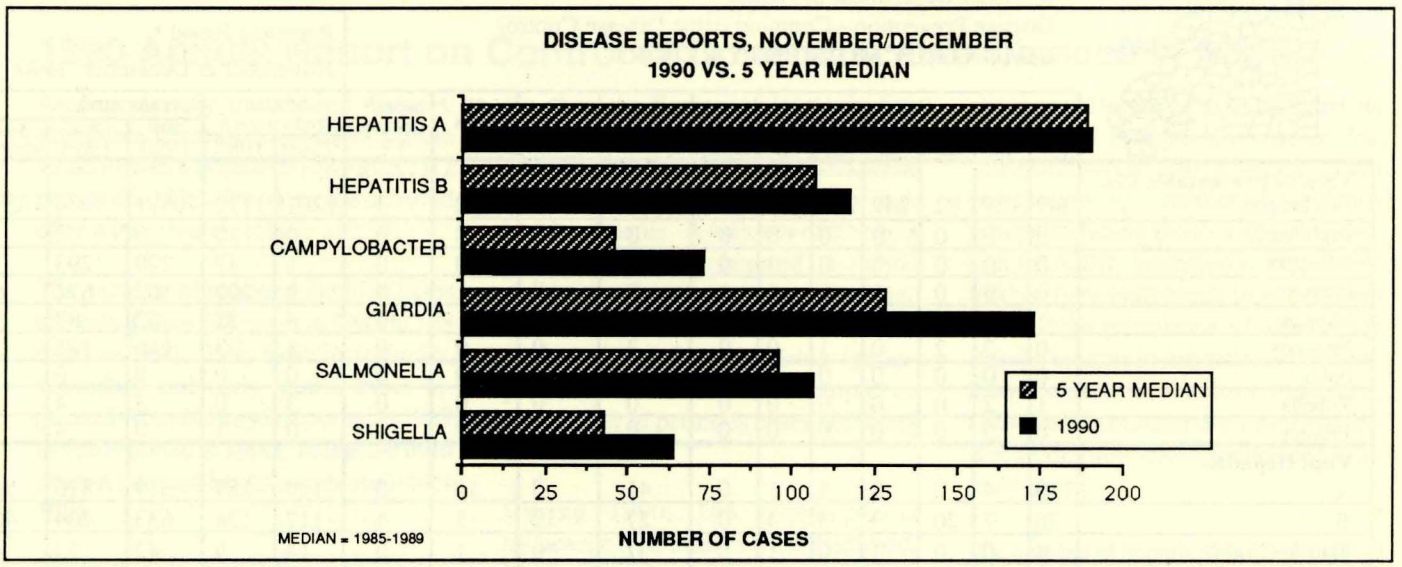
*Reporting Period Beginning November 4, Ending December 31, 1990.

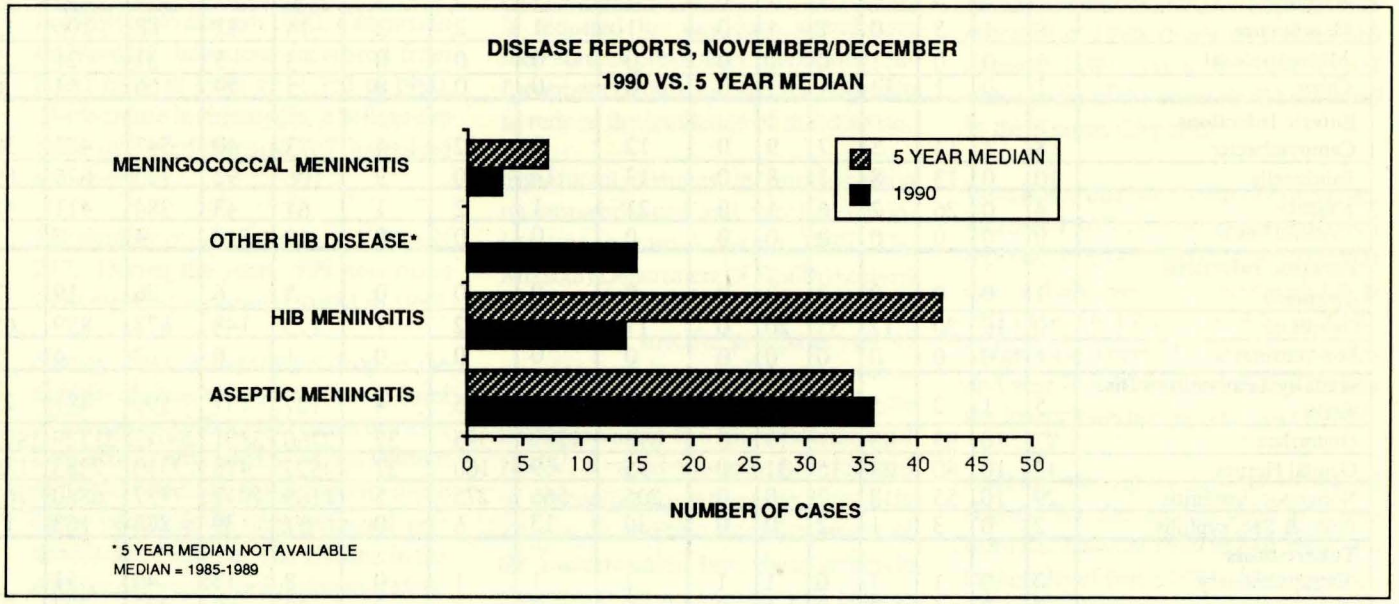
**Totals do not include KC, SLC, SLCo, or Springfield

***State and Federal Institutions

Due to data editing, totals may change.

TEAR OUT FOR FUTURE REFERENCE





ENTERICS

Campylobacter has increased 82% over 1989 cases and 58.7% over the five year median for November-December. Salmonella during the bimonthly period showed an increase of 15.2 % over 1989 and a 10.4% increase over the five year median for that period. Shigella trends showed a 48.8% increase over the comparable period in 1989 and the five year median for the period. The increase was largely due to a single day care outbreak.

MENINGITIS

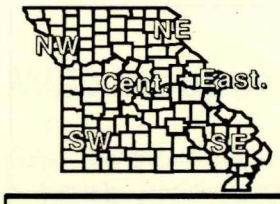
Aseptic meningitis is up 5.8% from November-December 1989 and from the five year median for the period. Meningococcal meningitis decreased 40% for the bimonthly period and 57.1% from the five year median. Hib meningitis is down 54.8% from 1989 and 66.6% from the bimonthly five year median. There were 15 cases of other invasive Hib disease reported in November-December 1990.

PARASITES

During the bimonthly period giardia showed a 16.9% increase from 1989 and an increase of 35.1% from the five year median.

VIRAL HEPATITIS

Hepatitis A has shown no discernible change for the bimonthly period, up only 0.5% from 1989, despite an outbreak starting in December 1990. The five year median for the period is the same as the 1989 figure. Hepatitis B is down 5.6% from 1989 for the bimonthly period and up 9.3% from the five year median. Hepatitis non-A non-B is up 55.5% from the same period in 1989.



Missouri Department of Health
Disease Prevention - Communicable Disease Control
BIMONTHLY MORBIDITY REPORT

Reporting Period *
January - February , 1991

	Districts							KANSAS CITY	ST. LOUIS CITY	ST. LOUIS CO.	SPGFLD GREENE CO.	2 MONTH STATE TOTALS		CUMULATIVE		
	** NW	NE	CD	SE	** SW	** ED	*** OTHER					1991	1990	FOR 1991	FOR 1990	5 YR MEDIAN
Vaccine Preventable Dis.																
Chickenpox	655	139	287	389	234	388	0	0	1	1	7	2101	2569	2101	2569	2418
Diphtheria	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Hib Meningitis	4	0	4	1	2	0	0	0	3	1	0	15	17	15	17	17
Hib Other Invasive	4	0	2	0	0	0	0	0	0	2	0	8	4	8	4	**
Influenza	0	2	11	0	1	1	0	0	3	6	0	24	207	24	207	40
Measles	0	0	0	0	0	0	0	0	0	0	0	0	47	0	47	0
Mumps	1	0	0	0	0	1	0	1	0	0	0	3	17	3	17	10
Pertussis	2	1	3	0	1	3	0	1	1	2	0	14	11	14	11	2
Polio	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Rubella	0	0	0	0	0	0	0	1	0	0	0	1	0	1	0	0
Tetanus	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Viral Hepatitis																
A	32	6	3	22	8	3	0	34	4	18	0	130	106	130	106	56
B	6	5	19	1	3	9	0	7	11	5	3	69	89	69	89	64
Non A - Non B	5	0	8	3	0	6	0	12	4	3	2	43	6	43	6	4
Unspecified	0	1	0	1	0	0	0	0	0	0	0	2	1	2	1	1
Meningitis																
Aseptic	6	0	2	0	2	3	0	2	1	8	2	26	19	26	19	11
Meningococcal	1	0	1	1	1	1	0	0	1	0	0	6	10	6	10	8
Other	5	0	1	2	2	2	0	0	0	0	0	12	17	12	17	11
Enteric Infections																
Campylobacter	1	0	12	12	7	6	0	5	5	19	8	75	44	75	44	26
Salmonella	5	2	9	8	2	4	0	4	4	12	8	58	84	58	84	72
Shigella	1	1	0	0	3	1	0	6	2	7	0	21	28	21	28	28
Typhoid Fever	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Parasitic Infections																
Amebiasis	1	0	1	0	1	1	0	1	2	0	0	7	2	7	2	2
Giardiasis	12	7	18	3	8	3	0	6	2	14	5	78	101	78	101	66
Sexually Transmitted Dis.																
AIDS	2	1	6	1	3	1	5	22	23	9	6	79	83	79	83	54
Gonorrhea	86	15	54	52	37	27	0	559	1243	492	22	2587	3178	2587	3178	2786
Genital Herpes	40	10	37	20	10	32	0	124	68	170	30	541	418	541	418	342
Nongonoc. urethritis	29	7	32	29	0	1	0	294	726	363	0	1481	929	1481	929	943
Prim. & Sec. syphilis	1	0	2	7	1	2	0	39	9	7	0	68	26	68	26	21
Tuberculosis																
Extrapulmonary	0	0	0	1	1	0	0	0	0	0	1	3	4	3	4	3
Pulmonary	1	3	2	2	5	2	2	1	5	1	2	26	29	26	29	22
Zoonotic																
Animal Bites	116	21	39	86	42	77	0	0	0	3	27	411	617	411	617	97
Psittacosis	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Rabies (Animal)	0	0	0	1	1	0	0	0	0	0	0	2	2	2	2	4
Rocky Mtn. Sp. Fever	0	0	0	0	0	0	0	0	0	0	0	0	2	0	2	0
Tularemia	0	0	1	0	0	0	0	0	0	0	1	2	3	2	3	3

Low Frequency Diseases

Anthrax
Botulism
Brucellosis
Chancroid
Cholera
Cryptosporidiosis
Encephalitis (infectious)
Encephalitis (viral/arbo-viral)
Granuloma Inguinale
Kawasaki Disease - 2
Legionellosis - 3
Leptospirosis
Lymphogranuloma Venereum - 1
Malaria - 2
Plague
Rabies (human)
Reye's Syndrome
Rheumatic fever, acute
Toxic Shock Syndrome - 4
Trichinosis

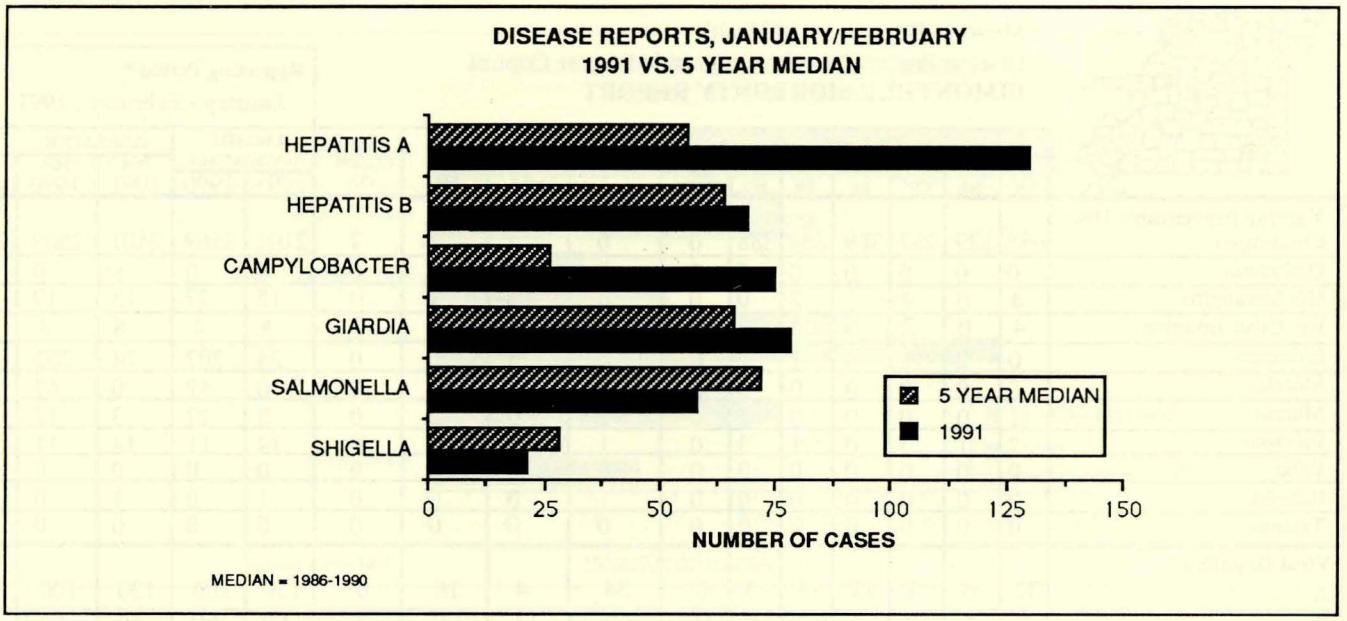
Outbreaks

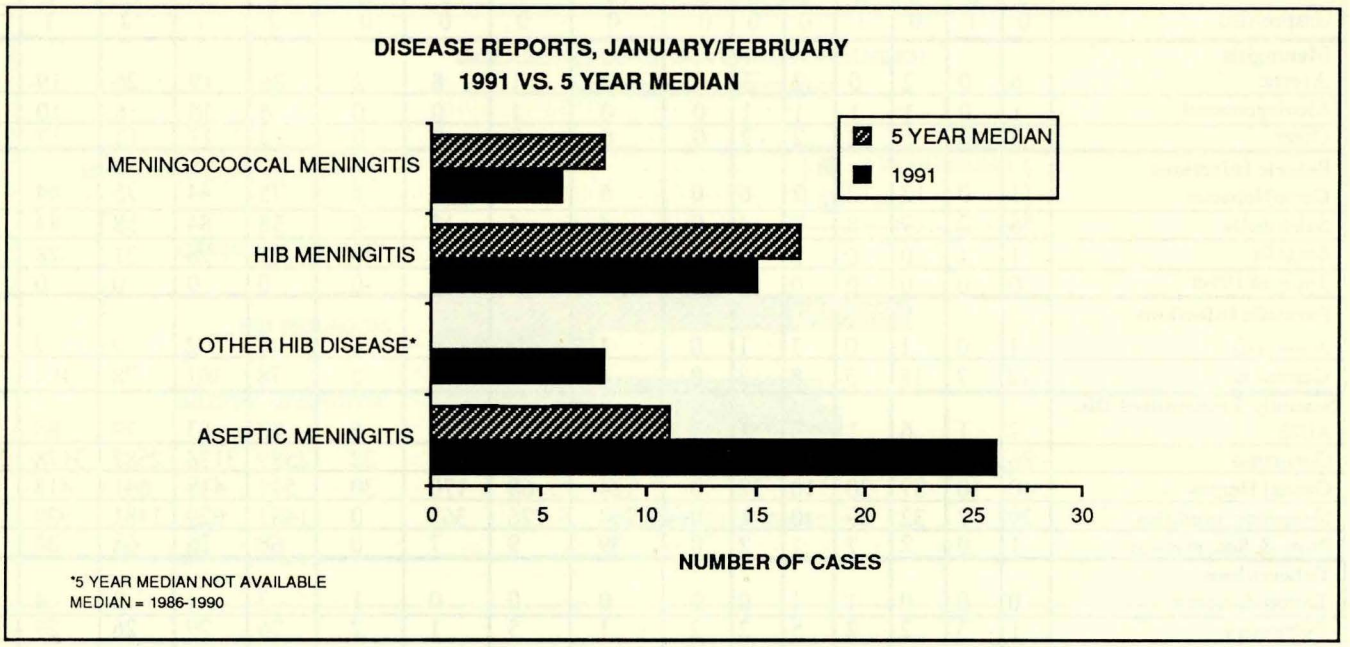
Foodborne - 3
Waterborne
Nosocomial - 4
Pediculosis
Scabies
Other - 5

*Reporting Period Beginning January 1, Ending March 2, 1991.
**Totals do not include KC, SLC, SLCo, or Springfield
***State and Federal Institutions
** Data not available

Due to data editing, totals may change.

TEAR OUT FOR FUTURE REFERENCE





ENTERICS

Campylobacter has increased 70.4% over 1990 for the first two months of 1991. Cases are up 188.4% over the five year median for January-February. Salmonella during the bimonthly period showed a decrease of 30.9 % from 1990 and a decrease of 19.4% from the five year median. Shigella trends are down 25.0% from 1990 and from the five year median.

MENINGITIS

Aseptic meningitis is up 36.8% from January-February 1990 and 136.3% from the five year median. Hib meningitis decreased by 11.7% from 1990 and from the five year median. Meningococcal meningitis is down 40% from 1990 and down 25% from the five year median for the period. Other invasive Hib disease increased 100% from the same period in 1990.

PARASITES

During the period of January-February 1991, giardia showed a 22.7% decrease from 1990 and an increase of 18.1% compared to the five year median.

VIRAL HEPATITIS

There was a 22.6% increase in hepatitis A during January-February 1991 and a 132% increase from the five year median; this was partially related to an outbreak starting in December 1990 (see article on page 12). Hepatitis B decreased 22.4% from 1990 but was increased 7.8% from the five year median for the bimonthly period.

Misconceptions Concerning Contraindications to Vaccination

Some health-care professionals inappropriately consider certain conditions or circumstances as contraindications to vaccination. These "missed vaccination opportunities" leave children unnecessarily susceptible to preventable diseases. The following conditions are those most often **inappropriately** regarded as contraindications to vaccination.

1. Reaction to a previous dose of DTP vaccine that involved only soreness, redness, or swelling in the immediate vicinity of the vaccination site or temperature of <105°F (40.5°C).
2. Mild acute illness with low-grade fever or mild diarrheal illness in an otherwise well child.
3. Current antimicrobial therapy or convalescent phase of illnesses.
4. Prematurity. The appropriate age for initiating vaccinations in the prematurely born infant is the usual chronologic age. Vaccine doses should not be reduced for preterm infants.
5. Pregnancy of mother or other household contact.
6. Recent exposure to an infectious disease.
7. Breast-feeding. The only vaccine virus that has been isolated from breast milk is rubella vaccine virus. There is no good evidence that breast milk from women vaccinated against rubella is harmful to infants.
8. A history of nonspecific allergies or relatives with allergies.
9. Allergies to penicillin or other antibiotics, except anaphylactic reactions to neomycin (e.g., MMR-containing vaccines) or streptomycin (e.g., OPV). None of the vaccines licensed in the United States contain penicillin.
10. Allergies to duck meat or duck feathers. No vaccine available in the United States is produced in substrates containing duck antigens.
11. Family history of convulsions in persons considered for pertussis or measles vaccination.
12. Family history of sudden infant death syndrome in children considered for DTP vaccination.
13. Family history of an adverse event, unrelated to immunosuppression, following vaccination.

Reprinted from the Morbidity and Mortality Weekly Report, April 7, 1989, Vol. 38, No. 13.

For more information call:
Bureau of Immunization
(314) 751-6133

Communicable Disease Outbreaks (January 1 - March 15, 1991)

Month	Disease	County	Setting	Estimated No. of Cases
January	Foodborne AGI	Clay	Restaurant	11
January	Foodborne AGI	Jackson	Restaurant	9
January	Giardiasis	Putnam	Extended family	3
January	AGI	Texas	Community	16
January	*Campylobacter sp.*	Perry	Dairy & Child Care	11
January	Fifth disease	Bollinger	School	11
February	*Campylobacter sp.*	Moniteau	Workplace	4
February	*Staph. aureus* poisoning	Buchanan	Restaurant	11
March	Influenza-like	St. Charles	School	500
March	Influenza-like	Johnson	School	60
March	Influenza-like	Gentry	School	98

Editor's Note: This list provides a summary of the outbreaks of communicable disease (other than nosocomial type) which have been reported to and/or investigated by the Bureau of Communicable Disease Control in recent months. AGI refers to acute gastrointestinal illness for which the causal agent was not known.

Hepatitis A Outbreak Related to a Restaurant

Mahree Bright, MA
Bureau of Communicable Disease Control

H. Denny Donnell, Jr., MD, MPH
Section of Disease Prevention

An outbreak of hepatitis A (HAV) related to a restaurant in Belton, Missouri occurred in late 1990 and early 1991. There were 110 serologically confirmed cases and 20 suspect cases with onset between November 28, 1990 and January 10, 1991. Five foodhandlers at the restaurant had HAV, with onsets on November 28 and December 10, 12, and 24 (two cases). A sixth worker was HAV-IgM antibody positive on January 2 but did not develop symptoms. The first ill patron had onset December 8 and the last became ill on January 10. Figure 1 shows the epidemiologic curve of the outbreak.

Three cases of unusually severe or fulminant hepatitis were reported. Two of these patients died, one despite receiving a liver transplant. The third improved and was discharged. An elderly restaurant customer with known congestive heart failure also died; postmortem serology was HAV-IgM positive, indicating recent or current HAV infection. Nine other HAV cases were hospitalized.

An Epidemic Intelligence Service (EIS) Officer from the Centers for Disease Control (CDC) assisted the Missouri Department of Health (DOH) in conducting an epidemiologic investigation. Of the 172 cases reported to Kansas City area health departments during the outbreak period, 130 (76%) met the definition of an outbreak-related case.* These cases ranged in age from 4 to 88 (mean age = 39). More males became ill than females, with a ratio of 1.8:1. The majority of the ill persons (61%) resided in Cass County. Cases also occurred in the following Missouri counties: one each in Bates, Camden, Johnson, Lafayette, Randolph, St. Louis, and Stone Counties, 18 in Jackson County, and 13 in Kansas City. Five other states were affected: 7 cases lived in Kansas and one lived in each of the following states: Oklahoma, Florida, Alabama, and Maine.

The investigation explored three hypotheses regarding the way the virus was transmitted: 1) contamination of high risk foods during handling by infected employees, 2) plumbing cross-connections inside or outside of the building resulting in contaminated water or ice, or 3) contaminated produce purchased by the restaurant.

The restaurant was inspected by environmental sanitarians from the Cass County Health Department and DOH on December 18. The overall score was 57/100, with significant violations including poor hygienic practices (employees drinking and smoking in the food preparation areas), failure to prevent cross-contamination of foods, and lack of soap at the handsink in the food preparation area. A follow-up inspection was performed on December 21, and the score improved to 89. Three minor plumbing cross-connections were detected during another DOH inspection on January 3, but they were not thought likely to have resulted in sewage contamination of the water supply. Produce had been purchased from sources common to many other establishments in the Kansas City area.

Most of the cases had eaten at the restaurant more than once, and many were regular customers. In order to determine which specific foods were associated with illness, a case-control study was conducted using the 23 cases who had eaten there three or fewer times during the six weeks preceding onset of illness. Thirty-one well eating companions of the cases, who had eaten there only with the cases, were used as the comparison group. Analysis of data from food preference interviews showed that cases were significantly more likely than their companions to have consumed salad at the restaurant (OR = 8.6, 95% CI 2<OR<40, p=.001). All the cases and 48% of the well controls had consumed lettuce, either in salad or as a garnish (OR undefined, p=.0001).

The first infected restaurant employee was the index case who became ill on November 28, and was probably infectious as early as mid-November. The case and the restaurant owner were interviewed regarding duties when the case was reported early in December and

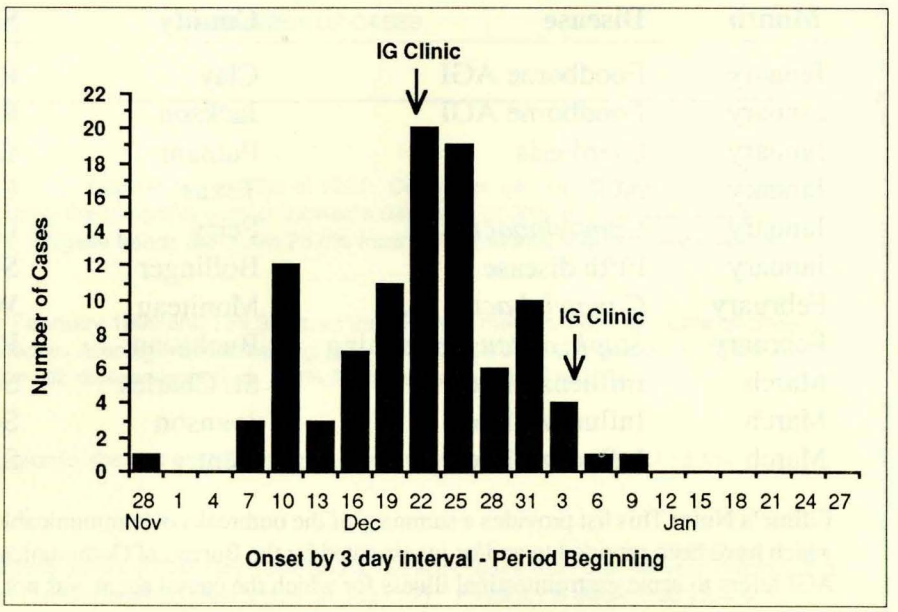


Figure 1. Hepatitis A, Cass county, Missouri, November 1990 to January 1991

both stated the case did not handle food. Upon re-interview after the outbreak began, it was learned that the index case did sometimes handle lettuce before it was rinsed and chopped. The other employee cases were all foodhandlers whose duties included preparing and serving salads. Cases could not be associated with any other establishment, so it did not appear likely that the restaurant had purchased contaminated lettuce. Direct contamination of food by infected workers was the most likely cause of the outbreak.

The first outbreak-related cases were reported on December 17. Control efforts began on December 19, when immune globulin (IG) was administered to the restaurant's employees. The restaurant closed voluntarily that day, pending serologic testing of the employees, and reopened on December 22 when all tested HAV-IgM negative (except those previously identified as cases). IG was eventually provided to almost 3,000 exposed persons through public health departments and to an unknown number by private physicians. Public IG clinics for restaurant patrons and contacts of known cases were held by DOH and the Cass County Health Department on December 22 and January 5 in Belton.

A resident of Cass County who worked in a restaurant in Kansas City developed HAV on December 24 after eating at the source restaurant. The Kansas City Health Department determined that the worker's duties did not involve hand contact with high risk foods or ice, so no clinic for patrons of the restaurant was held. No cases were subsequently detected in customers of that establishment.

The Cass County Health Department sanitarian visited all food service establishments in the Belton area during the peak of the outbreak to educate the managers regarding HAV prevention. DOH provided training classes for Belton area foodhandlers on January 10 and 17, with special emphasis on handwashing and the use of disposable gloves. A total of 486 persons attended those sessions. Additional classes were held by DOH and the Kansas City Health Department on February 21 and 26 for foodhandlers in the Kansas City metropolitan area.

The outbreak occurred in the midst of a national shortage of IG due to massive military use for Operation Desert Shield/Storm (see related item in this issue). DOH was able to get adequate emergency shipments from the sole manufacturer, thanks to the intercession of CDC's Hepatitis Branch.

The public and the media devoted much attention to the outbreak. Local physicians treated many of the patients and were very cooperative in promptly reporting new cases. The community of Belton provided essential support for control activities, including facilities for the investigative team at Research Belton Hospital, for the public clinics at St. Sabina Catholic Church and for the foodhandler training classes at Belton High School . The peak of the outbreak occurred during a period of bitterly cold weather and icy road conditions which made it more difficult to attend the clinics and classes, but turnout for both was high. No additional outbreak-related cases have been detected since January 10.

*Outbreak related case: onset of hepatitis after 11/27/90 with jaundice or positive HAV-IgM and a history of eating at the restaurant during the six weeks preceding onset of symptoms.

Availability of Immune Globulin (IG)

Mahree Bright, MA
Bureau of Communicable Disease Control

The domestic supply of IG has been reduced nationwide because a large amount has been supplied to the troops of Operation Desert Shield/Storm. Missouri is no exception; the DOH supply has dwindled to an all-time low. Demand has been unusually heavy recently as a result of hepatitis A activity in several areas of the state, including the outbreak in Belton. IG is being supplied only when there is definite, close exposure such as household contact with a serologically confirmed case of hepatitis A.

The sole commercial manufacturer of IG is Armour Pharmaceutical Company, which is filling back orders at this time. They have supplied IG in outbreak emergencies during the shortage.

The Michigan Department of Health also manufactures IG, which is sold in 2 cc ampules in packages of three ampules for $9.81. Their address is:

The Division of Biologics Products
Michigan Department of Public Health
Box 30035
Lansing, Michigan 48909
Ph: (517) 335-8120

REMINDER: Just a little reminder to those of you who have a Dickson temperature recorder - the batteries and pens need to be changed yearly. If you have not done so, this would be a good time to check them.

Hepatitis C Prevention

Hepatitis C virus (HCV), isolated in the last two years, is probably the major cause of both post-transfusion and community-acquired non-A non-B (NANB) hepatitis. A recently licensed test for anti-HCV antibody is used by blood banks for screening purposes. Blood donors are sent letters informing them of test results, prompting questions regarding the significance of a positive result.

It is estimated that approximately 150,000 cases of HCV hepatitis occur in the U.S. annually. As many as 50% may develop chronic liver disease, 10% chronic active hepatitis or cirrhosis, and an unknown number develop hepatocellular carcinoma. HCV accounts for over 90% of post-transfusion hepatitis cases in the U.S., with a 1-10% incidence of HCV acquisition after transfusion of blood products. There is evidence that HCV is also transmitted sexually, and such transmission may account for a large number of community-acquired HCV infections. Transmission also occurs through the sharing of contaminated needles associated with IV drug abuse. About 75% of cases may be asymptomatic. The incubation period is 6-9 weeks but may be as short as 2 weeks or as long as 6 months.

All donated blood is screened by blood banks for anti-HCV antibody; HCV screening of blood at donation is expected to decrease the post-transfusion hepatitis rate to below 1%. Specimens initially testing positive for anti-HCV antibody are retested twice; if either of these retested specimens are found to be positive, then the specimen is considered "repeatedly reactive" and is discarded, except for some instances where it can be used for autologous transfusion (transfusion into the donor at some later date). Results of clinical trials show that the specificity of this test is as low as 60%, i.e., there is a high rate of false positives, and as many as 40% of these who test repeatedly positive are most likely not infected. Also, it is not known at the present time if a true positive anti-HCV antibody test indicates past infection, present infection, or carrier status. For the present, persons who test "repeatedly reactive" on blood bank screening should be advised that: 1) there is a high probability that this is a false positive test; and 2) a true positive test can be an indication of past infection, of recent infection or of carrier status. A "supplemental test" for anti-HCV antibody is available from Abbott Laboratories, Chicago, IL, (708) 937-6100. These tests are more specific for HCV than the screening test used in blood banks. However, this test is considered supplemental and not confirmatory. Use of this test can be useful in some instances in determining if a positive anti-HCV result on a screening test is a false positive. Individuals who test positive for anti-HCV when donating blood should be made aware of the existence of this supplemental test and advised to consult their physician.

Whatever guidelines have been written in the past for NANB hepatitis hold true for HCV hepatitis. The same precautions regarding routes of transmission for hepatitis B virus are true for HCV. Percutaneous or mucosal contact with the bodily secretions of an acutely infected or chronic carrier of HCV could result in transmission of HCV.

Reprinted with permission from the Florida Department of Health and Rehabilitative Services Epi-Gram, Vol. 12, No. 2, March, 1991.

EDITOR'S NOTE:

CDC guidelines state: "For persons with percutaneous exposure to blood from a patient with parenterally transmitted non-A non-B hepatitis, it may be reasonable to administer IG (0.06 ml/kg) as soon as possible after exposure. In other circumstances, no specific recommendations can be made"[1]. Persons infected with HCV should observe "safer sex" guidelines and should be warned not to share needles if IV drug use is a risk factor. Acute HCV is reportable in Missouri along with other NANB hepatitis; however, NANB is the most underreported type of viral hepatitis here as well as nationwide[2]. During 1990, 42 acute cases of NANB hepatitis were reported, including 18 cases of hepatitis C.

REFERENCES:

1. ACIP. Protection against viral hepatitis. MMWR 1990;39:23.
2. Hepatitis surveillance report No. 53. Atlanta:Centers for Disease Control, 1990.

Spring-Loaded Fingerstick Device

Caryl Collier, RN, MPH, CIC
Nosocomial Infection Control Program

The Food and Drug Administration (FDA) has issued a safety alert regarding the use of capillary blood sampling devices because of associated transmission of hepatitis B[1]. These are spring-loaded lancet devices for finger and heel sticks that may or may not have a removable endplate or platform. The platform stabilizes the finger and serves to control puncture depth. Two outbreaks of hepatitis B, one in France involving 16 diabetics and one in California involving 23 diabetics and 4 patients who were not diabetics, have been reported since January, 1990[2-3]. In both reports, diabetic patients were being tested for glucose levels with the spring-loaded lancet device using the same finger platform for each patient.

Both outbreaks were initiated by hepatitis B carrier patients whose blood contaminated the platform of the device. Because the hepatitis B virus circulates

in the blood at high titers and can remain viable in a dried state for at least one week[4] infection is possible via percutaneous transmission.

These two outbreaks illustrate the potential for hepatitis B and other blood-borne pathogen transmission, including HIV, through blood contaminated equipment. For devices such as the "fountain pen" type which do not have removable platforms, single patient use should be maintained. An alcohol swab applied to the platform is not adequate disinfection. In order to minimize the possibility of blood-borne pathogen transmission, the FDA and the Centers for Disease Control recommend the following:

"As stated in the manufacturers' instructions, the lancet must be removed and discarded in appropriate sharps containers between patients; likewise, the platform must be removed and discarded. The remaining device component should be cleaned and disinfected at the end of each day, and more frequently, if visibly contaminated with blood.

Devices without a removable platform should only be used with one patient in the hospital or outpatient setting. After the patient is discharged, the device may be reused **only** if it is disinfected according to the manufacturer's instructions. If there are no instructions for disinfection, the device should be discarded.

As with any procedure in which exposure to blood is possible, health care workers should observe universal blood and body fluid precautions to prevent the transmission of hepatitis B, HIV, and other blood-borne pathogens"[1].

Proper use of spring-loaded blood sampling devices must be emphasized in the education of all health-care workers.

REFERENCES:

1. FDA Safety Alert: Hepatitis B transmission via spring-loaded lancet devices, August 28, 1990.

(continued on back page)

Public Health Laboratory Report

Newborn Screening — Hypothyroidism, Phenylketonuria, Galactosemia and Hemoglobinopathies

James Baumgartner, BS, MBA, Chief, Metabolic Disease Unit

	Nov 90	Dec 90	Total YTD
Specimens Tested	8,924	8,796	106,461
Initial (percent)	71.7	71.2	81,168
Repeat (percent)	28.3	28.8	25,293
Specimens: Unsatisfactory	241	275	2,376
HT Borderline	314	332	1,731
HT Presumptive	8	7	85
PKU Borderline	4	21	187
PKU Presumptive Positive		1	9
GAL Borderline	5	4	113
GAL Presumptive Positive		2	9
FAS (Sickle cell trait)	96	89	1,152
FAC (Hb C trait)	29	33	327
FAX (Hb variant)	9	18	141
FS (Sickle cell disease)	3	2	36
FSC (SC disease)	1	1	14
FC (Hb C disease)	1		5

	Jan 91	Feb 91	Total YTD
Specimens Tested	9,652	8,653	18,305
Initial (percent)	70.9	70.1	12,908
Repeat (percent)	29.1	29.9	5,397
Specimens: Unsatisfactory	149	98	247
HT Borderline	314	236	550
HT Presumptive	6	6	12
PKU Borderline	7	10	17
PKU Presumptive Positive			0
GAL Borderline	15	3	18
GAL Presumptive Positive	3	2	5
FAS (Sickle cell trait)	122	100	222
FAC (Hb C trait)	42	33	75
FAX (Hb variant)	13	9	22
FS (Sickle cell disease)	3	3	6
FSC (SC disease)	2	1	3
FC (Hb C disease)	1	1	2

HT = Hypothyroidism, PKU = Phenylketonuria, GAL = Galactosemia, Hb = Hemoglobin, SC = Sickle Cell, YTD = Year to Date

Clenbuterol

Erwin Gadd, RS
Bureau of Community Sanitation

The Food and Drug Administration (FDA) has received information alleging the widespread use of an illegal veterinary drug, **clenbuterol**, to increase muscle in meat-producing show animals, such as cattle, pigs and sheep. FDA is concerned about this because of possible adverse health effects in people who might consume food from treated animals and wants to state their position on this matter.

Clenbuterol is a beta-agonist drug. It is approved in Canada and many European and South American countries for use in nonfood-producing animals. No country has approved it for use in food-producing animals. In Spain, clenbuterol residue in beef liver caused the hospitalization of 135 people. The symptoms included increased heart rate, muscular tremors, headache, dizziness, nausea, fever and chills. These symptoms are of particular concern because the toxicity can appear suddenly following the consumption of clenbuterol residue. While no deaths have been reported, we are concerned about serious reactions in sensitive individuals, pregnant women, and people with heart disease.

Analytical methods are available to assay for the drug in urine and tissues. State, academic, and livestock show officials in Texas are cooperating fully with the United States Department of Agriculture and the FDA in the testing of animals from livestock shows in Texas. FDA wants to encourage such testing at livestock shows nationwide.

FDA intends to employ their full authority and resources to investigate and prosecute individuals who illegally import, distribute, sell or use clenbuterol.

The Department of Health has a memorandum of understanding with FDA in which it is committed to addressing unauthorized drug promotion. This authority is supported by Chapter 196, RSMo (1986). Referrals of misuse or unauthorized promotion should be made to the Department of Health, Division of Environmental Health and Epidemiology at (314) 751-6090.

(continued from page 15)

2. Douvin C, Simon D, Zinelabidine H, Wirquin V, Perlemuter L, Dhumeaux D. An outbreak of hepatitis B in an endocrinology unit traced to a capillary-blood-sampling device. N Engl J Med 1990;322:57-8.
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EPIDEMIOLOGIST

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Prevention of Heat-Related Illness

Physicians and other health care workers should exercise special care during hot weather to prevent their patients from acquiring heat-related illness in addition to their underlying medical condition.

Personal factors of age and general health, intake of foods and beverages, medications, clothing, exercise, and acclimatization affect the individual's probability of suffering from heat-related illness. Although heat-related illnesses can affect anyone, those most at risk are the very young, the elderly and the chronically ill. Many prescription drugs and excessive alcoholic intake have been noted to increase the likelihood of such illness. Some of these drugs include antipsychotics, major tranquilizers, antihistamines, over-the-counter sleeping pills, antidepressants, beta blockers, diuretics, amphetamines, and some antiparkinsonian agents.

Patients who are mentally or chronically ill, those who are acutely ill with febrile illness or diarrhea, and those who are confined to bed or otherwise unable to take care of themselves are more susceptible to heat-related illness. Other risk factors include a prior history of heatstroke, obesity, hyperthyroidism, and exercising in the heat without proper training.

Although the rate of deaths due to heat-related illnesses is higher among non-whites than whites, there is no evidence that this factor is due solely to race.

There are numerous environmental and personal risk factors involved in heat-related illness. The heat index reflects the joint impact of temperature and humidity on the body. The index is calculated for only a few locations across the state. Specific local factors, both outside of buildings and within, modify the impact for any given person. Cloud cover, shade trees, wind, asphalt and concrete, insulation, air conditioning, ventilation, and use of fans effect the heat stress for an individual. Diurnal fluctuation of temperature, including especially the extent of nighttime cooling, modifies the heat stress. The duration of exposure, including hours per day and number of successive days of exposure, also modifies the stress.

This summer as in the past, the Missouri Department of Health will monitor the heat index (also called apparent temperature). Through public health education and news bulletins concerning the possibility of heat-related illness, risk factors and prevention recommendations, we hope to increase the public consciousness regarding this environmental stress. With the assistance of local health agencies and district and metropolitan health offices, reports of heat-related illness will be monitored. A system of heat warning, heat alert and heat emergency messages has been agreed upon with the major metropolitan areas to facilitate notification of the public to take appropriate steps to prevent heat-related illness when necessitated by high heat indices.

Department of Health Heat Alert Policy

When a heat index of 105° is first reached (or predicted), the Department of Health will issue a **Heat Warning** urging personal caution and concern for others at high risk. Monitoring of temperatures will be intensified. The heat index is determined by measuring temperature and humidity and measures what hot weather "feels like."

When the afternoon heat index has been at least 105° for two days and when weather forecasts call for continued high stress conditions for at least 48 hours over a large proportion of the state, a **Heat Alert** will be issued. In a heat alert, the Department of Health will encourage local health departments to arrange for cooling shelters and encourage other community efforts to provide relief from the heat stress.

The Department of Health will recommend that a statewide **Heat Emergency** be declared when:

Inside this Issue...

1. Extensive areas of the state are experiencing high and sustained levels of heat stress, determined when the heat index reaches 105° for three days; and
2. Increased levels of heat-related deaths are found in these areas; and
3. The National Weather Service predicts hot, humid conditions are likely to continue for several days.

The heat emergency designation will be canceled when the heat index falls below 105° for 48 hours and the National Weather Service predicts a low probability that severe conditions will return within 48 to 72 hours.

1990 Heat Surveillance Summary

The summer of 1990 in Missouri started with high temperatures in mid-June followed by cooler than usual temperatures in mid-July. High temperatures returned in mid-August continuing until early September. All areas had peaks of high heat indices starting in mid-June 1990 with the highest peak occurring on July 4 before temperatures dropped down to a much cooler and comfortable level for July. Heat indices peaked again in mid-August continuing into early September. Unlike 1989 where heat indices continued to peak throughout the summer, 1990 brought much lower heat indices for July. Heat indices were much higher during August 1990 compared to 1989.

In March 1990, the Department of Health reviewed heat surveillance policies with the health officers in the various metropolitan areas and came to an agreement on terminology and procedures to be used for heat surveillance in 1990. All areas agreed to the use of **Warning** for the lowest, **Alert** for the middle range and **Emergency** for the highest level of heat stress detected by whatever index is selected as most appropriate for the community. Terminology and procedures for heat surveillance were shared with district and local health staff as well as the Governor's Office and the State Emergency Management Agency. A news release was issued on June 14 urging awareness of heat-related illnesses.

A statewide heat alert was issued on July 3, 1990 when the heat indices reached 111 in St. Louis, 105 in Kansas City, 106 in Columbia and 107 in Cape Girardeau. Heat indices remained high and the heat alert remained in effect for one week until lifted on July 11. A statewide heat warning was issued on August 27 when heat indices reached 106 in St. Louis, 106 in Kansas City, 109 in Columbia and 105 in Springfield. Heat indices remained high for only two days before returning to more comfortable levels. Temperatures in 1989 were much cooler and warranted only one heat warning.

Heat-related illnesses reported in 1990 were more than double those reported in 1989, whereas reported heat-related deaths were approximately the same for both years. Missourians' growing awareness regarding heat stress and illness may account for this. As in past years, the St. Louis area accounted for the majority of reported heat-related illnesses and deaths in 1990. The St. Louis public health authorities declared four heat warnings, one of which was elevated to a heat alert for thirteen days.

The nine heat-related deaths in 1990 occurred in persons who ranged in age from 41 to 87. Seven of those individuals were found in a home without air conditioning and one in a parked car. A 68 year old male was noted to have cardiac problems and a 41 year old female was a psychiatric patient on medication. A 61 year old male with a history of multiple sclerosis was found collapsed after cutting grass. Five of those who died were male and four were female; three were black, three were white and three were of unknown race.

We would like to thank all who participated in the heat surveillance system last year. We look forward to working with you this year in monitoring and preventing heat-related illnesses in Missouri. For further information, please contact the Office of Epidemiology, Ph: (314) 751-6128.

HEAT Index

Relative Humidity	Actual Temperature (F°) 70°	75°	80°	85°	90°	95°	100°	105°	110°	115°	120°
0%	64°	69°	73°	78°	83°	87°	91°	95°	99°	103°	107°
10%	65°	70°	75°	80°	85°	90°	95°	100°	105°	111°	116°
20%	66°	72°	77°	82°	87°	93°	99°	105°	112°	120°	130°
30%	67°	73°	78°	84°	90°	96°	104°	113°	123°	135°	148°
40%	68°	74°	79°	86°	93°	101°	110°	123°	137°	151°	
50%	69°	75°	81°	88°	96°	107°	120°	135°	150°		
60%	70°	76°	82°	90°	100°	114°	132°	149°			
70%	70°	77°	85°	93°	106°	124°	144°				
80%	71°	78°	86°	97°	113°	136°					
90%	71°	79°	88°	102°	122°						
100%	72°	80°	91°	108°							

Heat Index
Combined index of heat and humidity; or what it "feels like" to the body.

HOW TO USE THIS CHART: Across the top of the chart, locate the actual temperature. Down the left side of the chart, locate the relative humidity. Follow across and down to find the heat index. The heat index (also called the apparent temperature) reflects the combined effect of temperature and humidity on the body. The table shows the heat indexes caused by various combinations of air temperature and humidity.

Heat Index	Heat stress risk with physical activity and/or prolonged exposure
90°-105°	Heat cramps or heat exhaustion *possible*
106°-129°	Heat cramps or heat exhaustion *likely* Heat stroke *possible*
130° and up	Heat stroke *highly likely*

This chart is designed to provide general guidelines for assessing the potential severity of heat stress. Individual reactions to heat will vary. Remember that heat illness can occur at lower temperatures than indicated on the chart. In addition, studies indicate that susceptibility to heat disorders tends to increase with age.

Source: National Oceanic and Atmospheric Administration

Precautions When Taking Food on Outings

David Stull, RS, MPA
Bureau of Community Sanitation

When planning and preparing for an outdoor trip that will involve meals, the following precautions should be taken:

- Food items should be prepared at home as much as possible. Food to be prepared on the outing should involve limited preparation steps such as cooking hot dogs or hamburgers.
- The facilities to transport the food on the outing should be of the type that will maintain temperatures of cold food products below 45°F. A well insulated ice chest or cooler with sufficient amount of cooling agents such as ice or cold packs should be sufficient for short trips.
- Food products that are stored in ice should be protected from direct contact with the melting ice by placing food products in plastic bags or waterproof containers. If ice is used as a cooling medium, it should be from a safe water supply; free of bacteria or chemical contaminants.
- It is not recommended to take hot food items on outdoor trips, but if necessary, then provide insulated containers to maintain temperatures of 140°F or hotter.
- If hot or cold storage cannot be provided for certain food items, then food products that are dehydrated or packed in hermetically-sealed containers should be provided.
- If multi-use utensils are taken on the outing, consideration should be given to protecting the utensils from contamination that would occur by dust, dirt or insects. Consideration should also be given for providing enough safe water for food preparation and handwashing.
- Another very important consideration should be given to limiting the amount of time that the foods are placed in storage outside of the home kitchen and limiting the preparation to operations that are simple.
- Generally, it is best to discard food leftover from outdoor outings because of the extra handling and possibility of contamination.
- Finally, when serving the food for an outdoor meal remember that not only should the cooked food be thoroughly cooked and kept hot and the cold food kept cold, but the people consuming the meal should also be able to wash their hands to help keep the meal safe and wholesome.

For more information call your local health department or Bureau of Community Sanitation, Ph: (314) 751-6090.

Salmonella enteritidis Infection

Egg-associated salmonellosis is an increasing public health problem in the United States and several European countries. A bacterium, *Salmonella enteritidis*, can be inside perfectly normal-appearing eggs, and if the eggs are eaten raw or undercooked, the bacterium can cause illness. During the 1980's, illness related to contaminated eggs occurred most frequently in the northeastern United States, but now illness caused by *S. enteritidis* is increasing in other parts of the country as well. Consumers should be aware of the disease and learn how to minimize the chances of becoming ill.

For further information, contact your local health department or the Bureau of Veterinary Public Health, Ph: (314) 751-6136.

Reducing the Risk of *Salmonella Enteritidis* Infection

- Keep eggs refrigerated.
- Discard cracked or dirty eggs.
- Wash hands and cooking utensils with soap and water after contact with raw eggs.
- Cook eggs thoroughly before eating.
- Eat eggs promptly after cooking. Do not keep eggs warm for more than 2 hours.
- Refrigerate unused or leftover egg-containing foods.
- Avoid eating raw eggs (as in homemade ice cream or eggnog). Commercially manufactured ice cream and eggnog are made with pasteurized eggs and have not been linked with *Salmonella enteritidis* infections.
- Avoid restaurant dishes made with raw or undercooked, unpasteurized eggs. Restaurants should use pasteurized eggs in any recipe (such as Hollandaise sauce or caesar salad dressing) that calls for pooling of raw eggs.

Reprinted from the Centers for Disease Control/Center for Infectious Diseases, Division of Bacterial and Mycotic Diseases, *Salmonella enteritidis* Infection pamphlet, April 1991.

Tick-Borne Disease Summary - 1990

F. T. Satalowich, DVM, MSPH
Bureau of Veterinary Public Health

Tularemia

There were 33 cases of tularemia reported in 1990. See Figure 1. This is a decrease of 43 from the decade high of 58 cases in 1987 and a 15 percent decrease from the 39 cases in 1989. All but four cases occurred south of the Missouri River. Males continue to be at higher risk, accounting for 25 of the 33 cases (76%). Age distribution ranged from 5 years to 82 years, with five cases being 10 or under and three cases being 80 or over.

Rocky Mountain Spotted Fever

Missouri recorded 36 cases of Rocky Mountain spotted fever (RMSF) in 1990. See Figure 2. This is a 25 percent decrease from the 48 cases in 1989. As in years past, the majority of cases (97%) occurred south of the Missouri River or in counties adjoining the river. Age distribution ranged from 6 years to 75 years, with 30.5 percent of the cases occurring in adults 64 years of age or older. Seventy-five percent of the cases were males. Missouri had one human fatality in 1990.

Ehrlichiosis

The Centers for Disease Control have confirmed 17 cases of ehrlichiosis in Missouri in 1990. See Figure 3. This is four more cases than occurred in 1989. Ehrlichiosis was first diagnosed in Missouri in 1986. From 1988 through 1990, Missouri has averaged 12 cases per year. See Figure 4. As with other tick-borne diseases in the state, most cases occur south of the Missouri River.

Human ehrlichiosis is an acute febrile illness that is thought to be caused by *E. canis* or another closely related rickettsia. Epidemiologic, clinical and laboratory aspects of the disease are still being described. A previously unrecognized ehrlichia organism has been

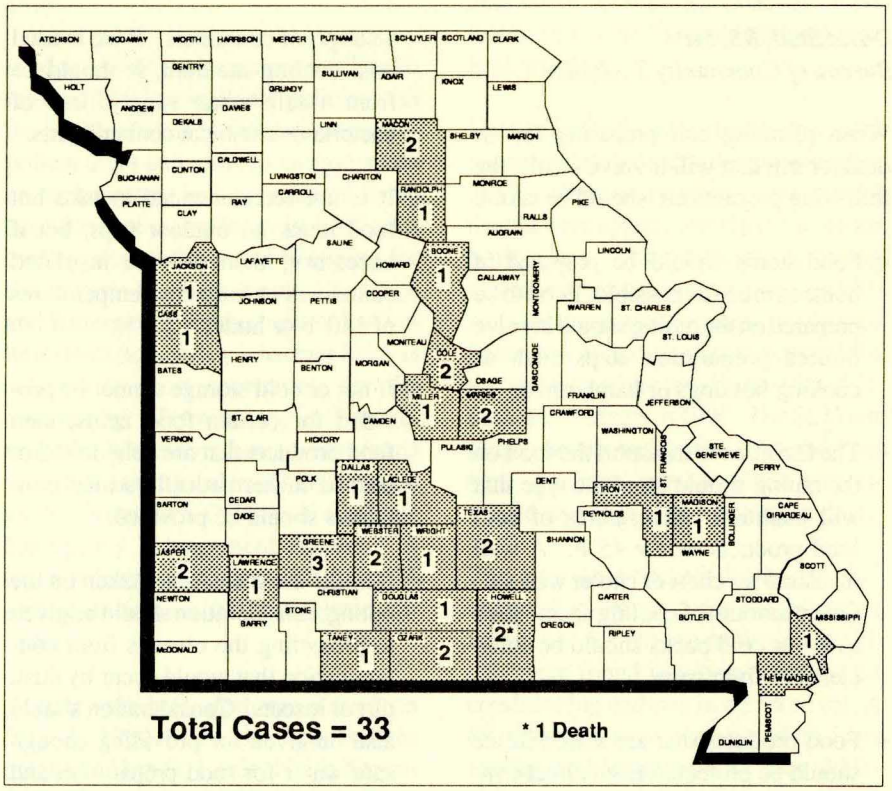

Figure 1. Tularemia cases in Missouri, by county, 1990

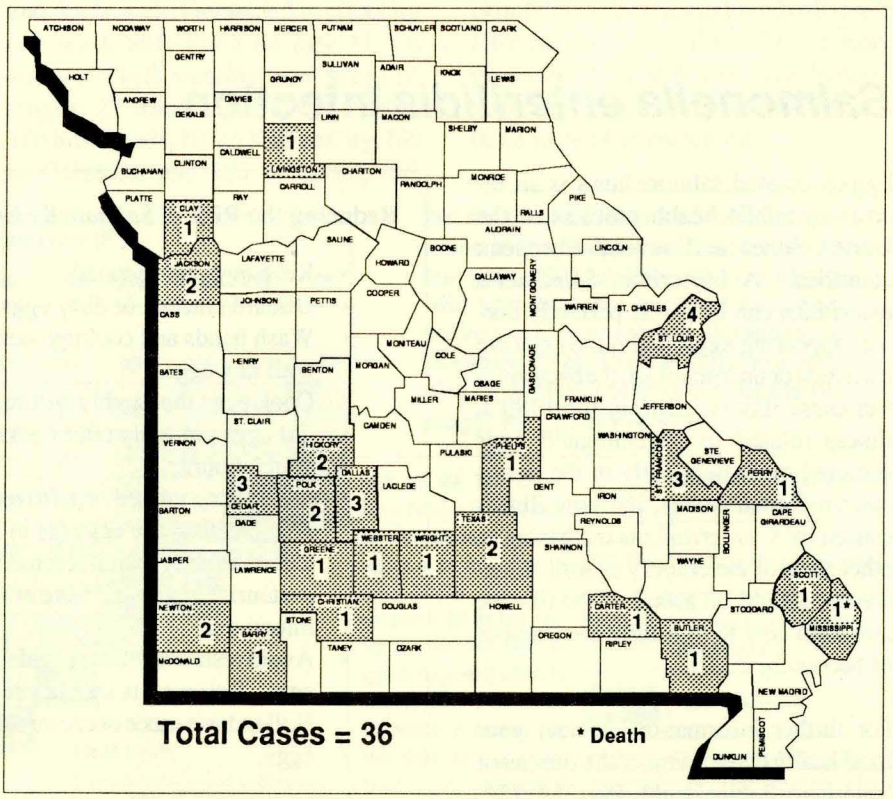

Figure 2. Rocky Mountain spotted fever cases in Missouri, by county, 1990

isolated from an individual diagnosed with ehrlichiosis. It is closely related to *E. canis* but distinct according to 165rRNA sequencing. The Veterinary Public Health Bureau's collaborative work with CDC has resulted in the development of a polymerase chain reaction technique to accurately determine if ehrlichia occurs in the peripheral blood. Continued work could prove this to be a quick, accurate diagnostic method. Most ehrlichiosis patients have a nonspecific febrile illness accompanied by headache, myalgia, anorexia, nausea, vomiting, chills and in some cases, by a rash. Laboratory abnormalities including leukopenia, thrombocytopenia and elevated levels of hepatic aminotransferases are common. Tetracycline appears to be effective in treating ehrlichiosis, the efficacy of other antibiotics has not been evaluated.

Sera from patients suspected to have ehrlichiosis or Rocky Mountain spotted fever who fail to develop specific RMSF antibodies and from other patients with a documented febrile illness compatible with ehrlichiosis, should be submitted to the Missouri Department of Health, State Public Health Laboratory. To facilitate the development of the new diagnostic test, patients suspected of having ehrlichiosis should have blood collected in a purple top tube along with acute serum specimens. The patient's clinical history should accompany the specimens. Paired sera (collected preferably 2-4 weeks apart) along with EDTA whole blood will be forwarded to the Centers for Disease Control for testing. For more information, please contact Dr. Satalowich in the Bureau of Veterinary Public Health, Ph: (314) 751-6136.

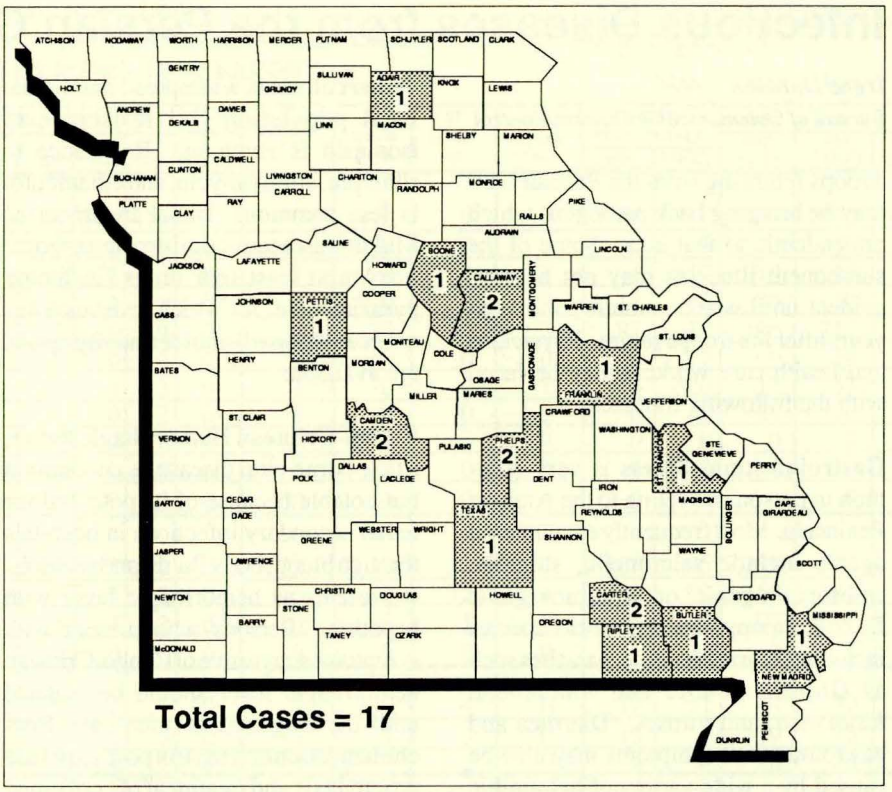

Figure 3. Ehrlichiosis cases in Missouri, by county, 1990

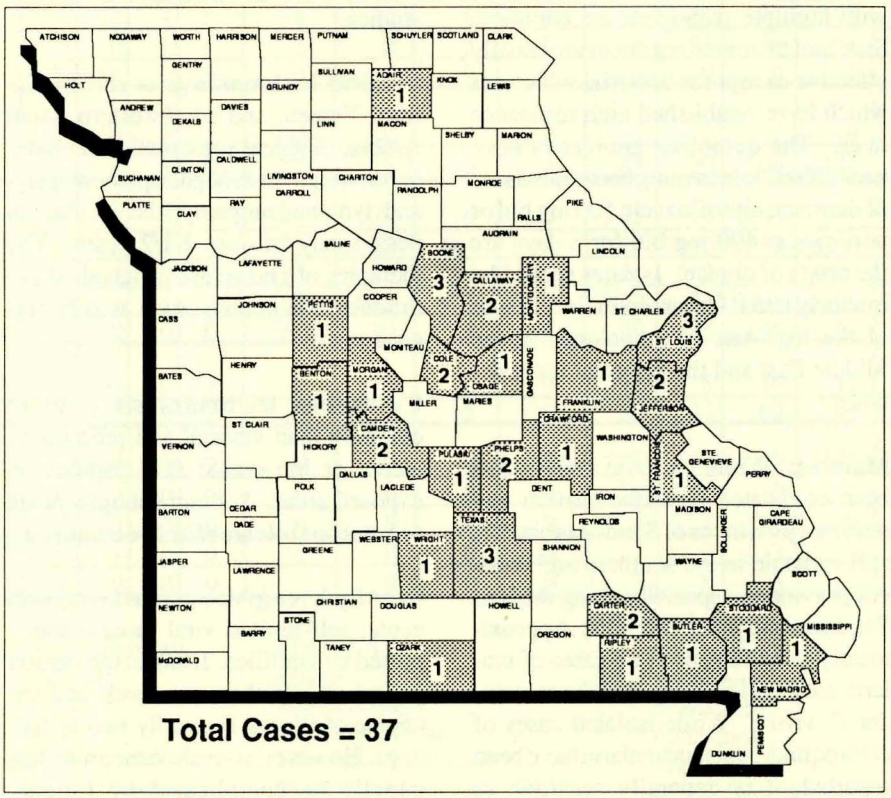

Figure 4. Ehrlichiosis cases in Missouri, by county, 1988-90

Prevention

The best preventive measure for all tick transmitted diseases is avoidance of tick-infested areas. Persons who must enter these areas should wear protective clothing and use repellants. Attached ticks should be removed by grasping them with fine tweezers at the point of attachment and pulling gently upward and backward. When fingers are used instead of tweezers, they should be protected with facial tissue and washed afterwards. Attachment sites should be disinfected. Only ticks that have had a blood meal (are engorged) transmit disease.

Infectious Diseases from the Persian Gulf

Irene Donelon
Bureau of Communicable Disease Control

Troops returning from the Persian Gulf may be bringing back pathogens which are endemic to that area. Some of the subsequent illnesses may not become evident until weeks, months, and even years after the troops return. Physicians and health care workers may be faced with the following illnesses:

Gastrointestinal illness is very common in persons traveling to the Arabian Peninsula. Most frequently encountered agents include salmonella, shigella, enteropathogenic or enterotoxigenic *E. coli*, campylobacter, vibrio species including *Vibrio cholerae*, parasites such as *Giardia lambia* and *Entamoeba histolytica*, and viruses. Diarrhea and gastrointestinal symptoms may also be caused by a wide variety of helminthic infections found in this area. Infections with multiple pathogens are common. Standard treatment regimens are usually effective except for bacterial infections which have established high resistance rates. The quinolone antibiotics have been effective in treating bacterial causes of diarrhea; ciprofloxacin 500 mg bid or norfloxacin 400 mg bid for 3 days are the drugs of choice. Isolates should be routinely tested for susceptibility because of the high use of quinolones in the Middle East and the potential for resistance.

Malaria: While endemic malaria has been eradicated from the eastern and northern provinces of Saudi Arabia, it is still endemic in the southern and western provinces, especially along the Red Sea coast and in the foothills. Approximately three fourths of all cases of malaria are *P. falciparum*, and the remainder *P. vivax*. While isolated cases of chloroquine-resistant malaria have been reported, it is generally sensitive to chloroquine.

Tuberculosis is widespread among the local population and resistance to isoniazid is common. Resistance to rifampin, streptomycin, and ethambutol is less common. Initial treatment of Middle East acquired tuberculosis should involve at least four drugs (including pyrazinamide, for which resistance has not been reported) until sensitivity results are available.

Congo-Crimean Hemorrhagic Fever, a tick-borne viral disease, is uncommon but notable because of its potential for lethal secondary infections in hospitals through blood, body fluids, and aerosols. It presents as hemorrhagic fever with hepatitis. Persons who present with symptoms suggestive of Congo-Crimean hemorrhagic fever should be isolated until the diagnosis is ruled out. Recommendation of ribavirin post-exposure prophylaxis and treatment of confirmed cases is based on *in vitro* and animal studies.

Visceral leishmaniasis is endemic in Iraq, Yemen, and southwestern Saudi Arabia. Typical presentation includes fever, weight loss, hepatosplenomegaly, and lymphadenopathy; the incubation period may be over 2 1/2 years. The therapies of choice are pentavalent antimonial compounds, such as stibogluconate.

Cutaneous leishmaniasis is more common than visceral and presents as ulcers or intractable skin papules on exposed areas. Sodium stibogluconate or ketoconazole are effective treatments.

Sandfly fever (phlebotomus fever) is an acute, self-limited viral disease transmitted by sandflies. It has an incubation period of less than one week and the course of illness is usually two to five days. However, convalescence may frequently be complicated by fatigue, weakness and depression. This should be taken into account when evaluating post traumatic stress-like syndrome or chronic fatigue in persons returning from the Persian Gulf (serologic assays are available from the CDC, Ft. Collins, CO, or USAMIID, Ft. Detrick, MD).

Hepatitis A, hepatitis B, delta hepatitis, and non-A, non-B hepatitis are common.

Other infectious diseases which may occur include louse-borne and flea-borne typhus, meningococcal disease, enteric fever including *Salmonella typhi*, rabies, brucellosis, Q fever, and acute schistosomiasis.

Although gastrointestinal illness is the most common infectious disease affecting persons returning from the Middle East, the clinician must be alert to the wide range of possible infections, long incubation periods, and the possibility of emergence years after exposure in persons who become immunosuppressed.

Questions regarding management of suspected infectious diseases in persons returning from the Persian Gulf may be referred to the Walter Reed Army Medical Center, Infectious Disease Section, Ph: (202) 576-1740, 1741 or 1742.

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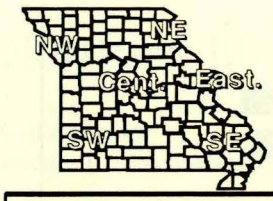


Missouri Department of Health
Disease Prevention - Communicable Disease Control

BIMONTHLY MORBIDITY REPORT

Reporting Period *
March - April, 1991

	Districts							KANSAS CITY	ST. LOUIS CITY	ST. LOUIS CO.	SPGFLD GREENE CO.	2 MONTH STATE TOTALS		CUMULATIVE		
	** NW	NE	CD	SE	** SW	** ED	*** OTHER					1991	1990	FOR 1991	FOR 1990	5 YR MEDIAN
Vaccine Preventable Dis.																
Chickenpox	665	128	234	571	381	410	0	0	0	0	0	2389	3213	4490	5961	5921
Diphtheria	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Hib Meningitis	1	0	0	0	1	0	0	1	0	1	0	4	17	18	34	36
Hib Other Invasive	9	0	1	0	1	1	0	3	0	0	0	15	6	25	10	**
Influenza	4	0	9	2	0	9	0	4	20	32	2	82	10	106	217	77
Measles	0	0	0	0	0	0	0	0	0	0	0	0	12	0	59	35
Mumps	5	0	1	1	1	3	0	2	0	0	1	14	20	17	37	22
Pertussis	1	0	2	1	0	2	0	0	0	0	0	6	9	20	20	9
Polio	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Rubella	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0
Tetanus	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Viral Hepatitis																
A	16	1	15	17	13	2	0	22	10	11	1	108	95	239	201	197
B	16	5	13	9	5	3	0	16	9	12	4	92	92	152	181	192
Non A - Non B	10	0	11	3	4	2	0	20	8	1	0	59	5	97	11	13
Unspecified	0	1	0	0	0	0	0	0	0	0	0	1	4	3	5	6
Meningitis																
Aseptic	3	0	2	0	1	7	0	2	0	4	0	19	11	44	30	19
Meningococcal	0	0	1	2	1	2	0	3	1	3	0	13	2	19	12	16
Other	3	0	0	1	0	1	0	1	0	2	0	8	9	20	25	23
Enteric Infections																
Campylobacter	10	1	6	2	5	5	0	5	2	6	5	47	60	122	104	81
Salmonella	4	3	5	4	10	3	0	6	6	8	4	53	43	107	127	163
Shigella	4	0	2	1	0	1	0	2	2	3	0	15	23	36	51	50
Typhoid Fever	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2
Parasitic Infections																
Amebiasis	0	0	0	0	0	0	0	0	0	0	0	0	2	7	4	6
Giardiasis	18	3	9	5	5	8	0	11	5	20	3	87	90	166	191	156
Sexually Transmitted Dis.																
AIDS	1	9	4	8	2	3	5	21	20	6	6	85	90	164	173	118
Gonorrhea	107	16	68	50	62	23	0	771	1168	414	16	2695	3650	5282	6828	5504
Genital Herpes	45	10	31	34	11	25	0	131	91	186	31	595	669	1136	1087	704
Nongonoc. urethritis	23	8	22	24	1	1	0	293	683	417	0	1472	1177	2401	2106	2273
Prim. & Sec. syphilis	2	0	0	0	0	0	0	64	10	4	0	80	35	148	61	45
Tuberculosis																
Extrapulmonary	0	0	0	0	2	0	2	0	3	4	0	11	8	14	12	12
Pulmonary	0	1	5	5	5	1	2	5	7	5	0	36	37	62	66	67
Zoonotic																
Animal Bites	167	22	50	100	114	105	0	0	0	0	0	558	833	969	1354	1049
Psittacosis	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Rabies (Animal)	0	2	0	0	2	0	0	0	0	0	0	4	8	6	10	17
Rocky Mtn. Sp. Fever	0	0	0	0	1	0	0	0	0	0	0	1	0	1	2	0
Tularemia	0	0	1	1	0	0	0	1	0	0	0	3	0	5	3	4

Low Frequency Diseases

Anthrax
Botulism
Brucellosis
Chancroid - 3
Cholera
Cryptosporidiosis
Encephalitis (infectious) - 4
Encephalitis (viral/arboviral)
Granuloma Inguinale
Kawasaki Disease - 5
Legionellosis - 2
Leptospirosis - 1
Lymphogranuloma Venereum - 1
Malaria - 1
Plague
Rabies (human)
Reye's Syndrome
Rheumatic fever, acute
Toxic Shock Syndrome - 2
Trichinosis

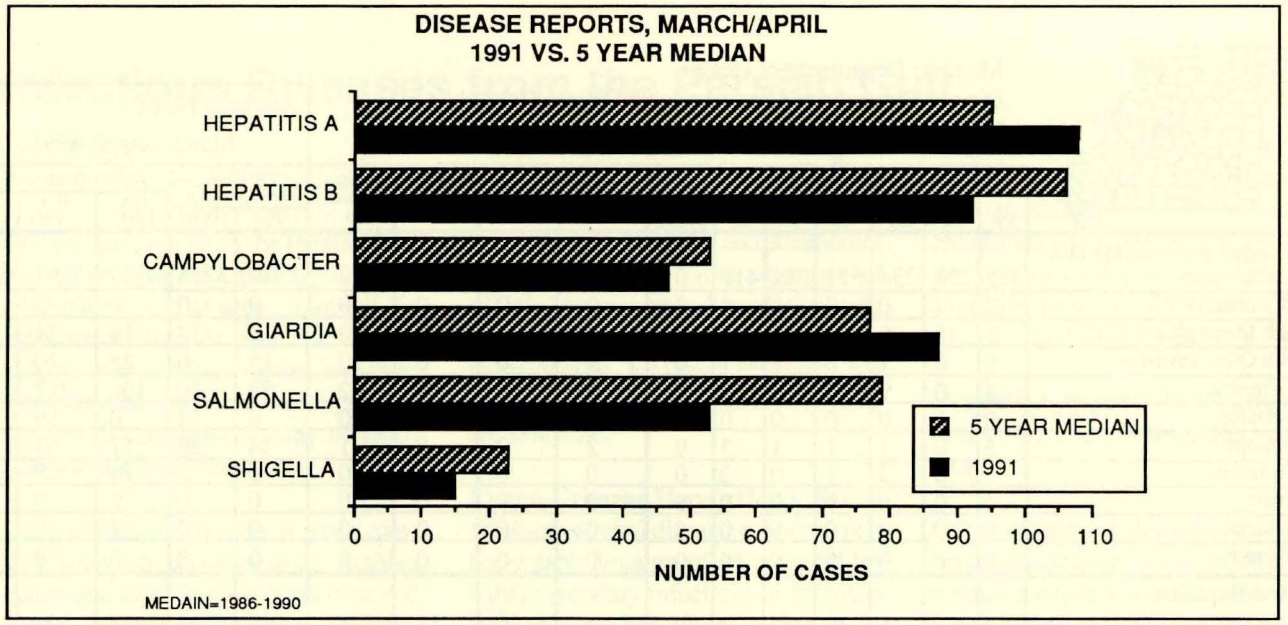
Outbreaks

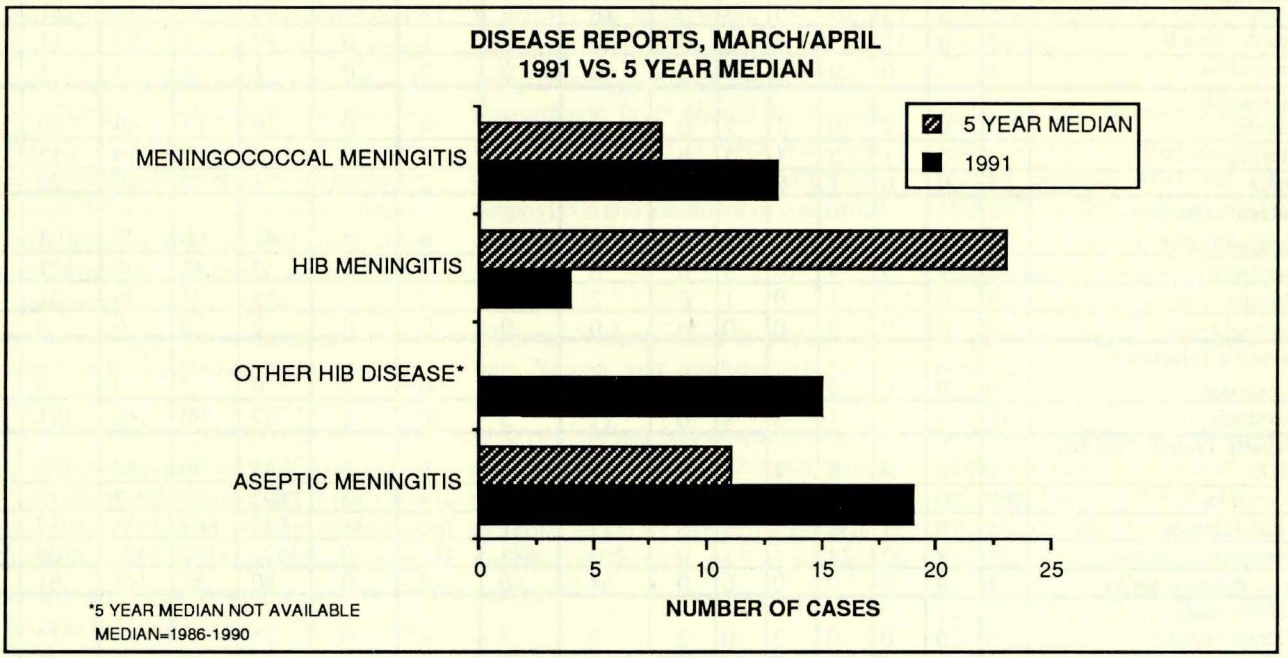
Foodborne - 2
Waterborne
Nosocomial - 7
Pediculosis
Scabies
Other - Hepatitis A - 3
Influenza - 1
Flu-Like - 4
Meningococcal Meningitis - 1

*Reporting Period Beginning March 3, Ending April 27, 1991.
**Totals do not include KC, SLC, SLCo, or Springfield
***State and Federal Institutions
** Data not available

Due to data editing, totals may change.

TEAR OUT FOR FUTURE REFERENCE





ENTERICS

Campylobacter has decreased 21.7% from 1990 to 1991 for the bimonthly period of March-April. Salmonella has shown a 23.3% increase and Shigella has shown a 34.8% decrease when compared to the 1990 bimonthly period. All enterics have decreased when compared to their bimonthly five year medians; Campylobacter 11.3%, Salmonella 32.9% and Shigella 34.8%.

MENINGITIS

Aseptic meningitis is up 72.7% from the 1990 bimonthly period and meningococcal meningitis is up 550.0% when compared to 1990. When compared to the bimonthly five year medians, aseptic meningitis and meningoccocal meningitis have shown increases of 72.7% and 62.5%.

HIB DISEASE

Hib meningitis is down 76.5% for the March-April 1991 period when compared to 1990 and down 82.6% when compared to the five year median. Other invasive Hib disease is up 150.0% from the 1990 period with 15 cases in 1991. There is no five year median for other invasive Hib disease at this time.

VIRAL HEPATITIS

Hepatitis A is up 13.7% from the 1990 bimonthly period and the five year median. Hepatitis B showed no change in the number of cases for the bimonthly period from 1990 to 1991 and was down 13.2% when compared to the five year median.

Diarrheal Illness Associated With Blue-Green Algae

Michael Fobbs
Bureau of Communicable Disease Control

Introduction

On June 20, 1990, the Barton County Health Department reported receiving numerous complaints of gastrointestinal illness. Initial investigation found an increased incidence of gastrointestinal illness being reported in the Lamar area by local physicians. Preexisting problems with the water supply in the community and the widespread pattern of illness led health officials to suspect possible waterborne transmission. A boil water order was issued by the Department of Natural Resources and the Missouri Department of Health on the evening of June 20, 1990. Plans were formulated for an epidemiologic investigation which began on June 21. The purpose of the investigation was to determine the cause of the reported illness and to make appropriate recommendations for control measures.

Lamar is in rural western Missouri and is the county seat of Barton County. The 1980 population of Barton County was 11,400, with 4,053 people residing within the Lamar city limits. The economy of Barton County is primarily agricultural, with some light industry in Lamar.

The potable water supply is obtained from a city-owned lake. The lake has a water surface area of 145 acres and a capacity of 1,593 acre feet. The water for the lake comes from a 3,000 acre watershed area.

The Department of Natural Resources had been working with the city of Lamar for several months prior to the outbreak concerning taste and odor problems related to algae in the lake. Heavy algae growth had been noted in the lake during the spring, and had prompted the application of copper sulfate on June 8 and 11. The Department of Natural Resources investigation report to city officials regarding the city water treatment facility, dated June 14, listed 22 unsatisfactory features and included recommendations for corrections. Several of the deficiencies affected the flocculation and filtration processes, the most important steps in algae removal. Routine water samples had been reported as bacteriologically safe based on indicator organism testing, so no "boil water" order had been issued prior to June 20.

Epidemiologic Investigation

An epidemiologic investigation team was formed consisting of communicable disease investigators, nurses and sanitarians. Local hospitals, physicians, nursing homes, a senior citizen center, a day care center, the county courthouse, and several businesses were contacted to identify recent suspect cases of gastrointestinal illness.

Suspect cases were contacted by telephone and interviewed regarding their illness and water/ice consumption for the week prior to onset of illness, using a standard questionnaire. They were also questioned regarding other possible common exposures, such as group gatherings and restaurant meals. Suspect cases were asked if they knew of other ill persons; these persons were then interviewed by telephone.

Of 162 persons interviewed, 109 met the case definition (diarrheal illness with ≥ 3 loose stools within a 24 hour period with onset since May 1,1990 and exposure to Lamar city water). Their ages ranged from <1 to 87 years with a mean of 38.6 years. Ninety-five (93.6%) were Lamar residents. Onset dates were available for 108 of the 109 cases and are shown in Figure 1. The earliest identified onset was on May 1 and the peak of the illness occurred from June 5 to June 25. The largest number of cases with onset on a given day was eight, on June 8 and June 20. The duration of illness ranged from 1 to 31 days, with a median of 3 days.

A case control study using 50 matched pairs was conducted. One control was obtained for each case using a systematic random digit dialing method. Controls were matched for city of residence and for age, using 20-year intervals for adults and ten-year intervals for children under 21. The interviews were conducted using the same questionnaire administered to the cases. Exposure histories were obtained for the time period

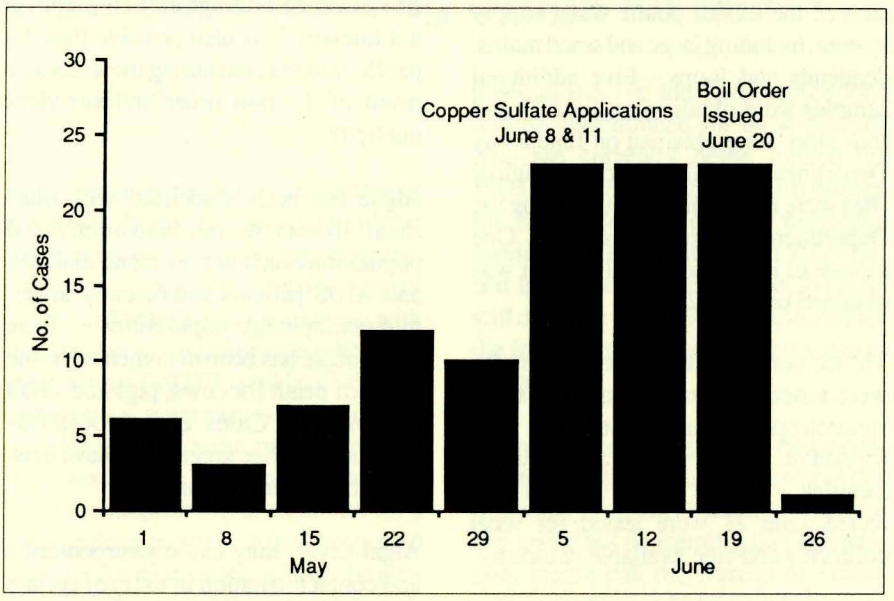


Figure 1. Cases of gastroenteritis by onset date, seven day interval beginning with date shown, Lamar, Missouri, 1990

corresponding to one week prior to onset of illness in the matched case.

The data from the case-control study were analyzed using the 41 matched pairs who resided in Lamar. The study cases ranged in age from <1 to 79 with a mean of 38.8, and 61% were female. The controls had an age range of 2 to 82 with a mean of 41.2, and 51% were female. Consumption of any Lamar municipal water was significantly related to illness. Cases were more likely than controls to have consumed city water (odds ratio=4.64, 95% CI 1.06-23.3, p=.018). Consumption of city water in any form (water, drinks or ice) was also related to illness (odds ratio=9.70, 95% CI 1.11-221.0, p=0.014 (one tailed Fisher's exact)).

Eleven stool specimens were obtained from ill persons and tested for salmonella, shigella and campylobacter at the Southwestern District Branch Laboratory in Springfield. Thirteen stool specimens from ill persons were examined for ova and parasites at the State Public Health Laboratory in Jefferson City. Six stool specimens were sent to the Centers for Disease Control in Atlanta, Georgia to be examined for algae.

Eighteen water samples were obtained by a Department of Natural Resources representative on June 21 from scattered sites of the Lamar public water supply system, including large and small mains, deadends and loops. Five additional samples were obtained on June 22 and four more were obtained on June 23 by Department of Health. Six of the original sites were re-sampled on June 26 by the Department of Natural Resources. One sample of ice made with city water was obtained on June 22.

The ice sample and all 33 water samples were tested for total coliform bacteria. Heterotrophic plate counts were performed on the ice sample and 24 water samples. The 18 water samples collected June 21 were tested for fecal coliforms and free available chlorine.

Water samples were collected from the city-owned lake on June 26 by a team led by Russell Rhodes, Ph.D., Biology Department, Southwest Missouri State University. These samples were examined to characterize the types of algae found. Two other water samples from the public water supply were voluntarily submitted by an individual and a local institution because of visible green particles and were examined by Dr. Rhodes.

Laboratory Results

Stool samples were negative for standard enterics, parasites and algae. The total coliform and fecal coliform counts in the water supply were determined to be within acceptable limits though the chlorine residuals were below required amounts. Excessive turbidity and particulate matter in the water was noted.

Numerous algae were found in the lake samples taken on June 26, and algae genus *Anabaena* were detected in two samples of municipal water. Two of the species found in the lake, *Anabaena flos-aquae* and *Microcystis aeruginosa*, are toxin producing blue-green algae.

Discussion

It is unclear whether the rather precipitous ending of the outbreak was due to a decrease in algae in the water supply or the destruction of toxin(s) by boiling (the effect of boiling on such toxins is not known). It is also possible that the public stopped consuming the water as a result of the boil order and attendant publicity.

Algae has been associated with diarrheal illness in immunosuppressed populations such as transplant, dialysis, and AIDS patients and recently in immunocompetent populations[1,2]. Blue green algae has been documented as the cause of death for cows, pigs and small mammals[3,4,5]. Cases of gastroenteritis attributed to blue-green algae have been reported in Pennsylvania[6].

Algal toxins may cause gastroenteritis and contact irritation in users of certain recreational and municipal water supplies. The toxins suspected of causing gastroenteritis are the polypeptide toxins and the lipopolysaccharide endotoxins. Potential sources of algal toxins include sewage oxidation ponds, groundwater recharge operations, wastewater irrigation, and surface reservoirs[7].

Often algal blooms are treated with copper sulfate causing the death of the algae. Toxins found inside the cell are released when the cell dies or disintegrates[8]. The treatment may cause an increase in illness unless sufficient time elapses for the toxin to be destroyed or diluted.

Exposure to algal toxins may cause repeated and prolonged gastroenteritis[9] and should be considered particularly in instances where illness is chronic and where the possibility of bacteriologic or viral contamination has already been assessed.

Conclusions

The increase in gastrointestinal illness in Lamar during May and June, 1990 was epidemiologically associated with consumption of municipal water. No bacterial cause of the illness was found. Pre-existing problems with the water processing plant and a large algae "bloom" in the source lake apparently led to algae contamination of the finished water. Illness caused by algal toxins has been documented previously. The available evidence points to consumption of algal toxins as the cause of this outbreak.

Recommendations

1. It was strongly recommended that the City of Lamar correct the unsatisfactory features identified in the June 14, 1990 Department of Natural Resources report on the public water supply, with special emphasis on factors contributing to the algae problem. (Repairs to the water plant were started April 1991 and have not yet been completed.)

2. Surveillance for communicable diseases should be continued by the local health department and the Department

of Health, and any suspected outbreaks should be promptly investigated.

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State Public Health Laboratory Report

Newborn Screening — Hypothyroidism, Phenylketonuria,Galactosemia and Hemoglobinopathies

James Baumgartner, BS, MBA, Chief, Metabolic Disease Unit

	Mar 91	Apr 91	Total YTD
Specimens Tested	9,200	9,613	37,118
Initial (percent)	70.0%	69.9%	26,080
Repeat (percent)	30.0%	30.1%	11,038
Specimens: Unsatisfactory	134	127	508
HT Borderline	332	241	1,123
HT Presumptive	8	3	23
PKU Borderline	14	22	53
PKU Presumptive Positive		3	3
GAL Borderline	19	92	129
GAL Presumptive Positive	6	7	18
FAS (Sickle cell trait)	105	107	434
FAC (Hb C trait)	19	13	107
FAX (Hb variant)	18	18	58
FS (Sickle cell disease)	1	2	9
FSC (SC disease)		2	5
FC (Hb C disease)	1		3

HT = Hypothyroidism, PKU = Phenylketonuria, GAL = Galactosemia, Hb = Hemoglobin, SC = Sickle Cell, YTD = Year to Date

State Not Providing Drugs for MOTT

Vic Tomlinson
Bureau of Tuberculosis Control

As a result of the anticipated shortage of available funds for antituberculosis medications, the following program change is being made effective August 1, 1991. Medications for patients with disease due to mycobacteria other than tuberculosis (MOTT) will be discontinued after a suspect case is determined to have MOTT by laboratory confirmation. All suspect cases of tuberculosis will be provided medications each month for a total of three months. After this period of time, the medication will not be provided by the state if the laboratory culture indicates mycobacteria other than tuberculosis. In addition, medications will be discontinued for those patients who are currently being treated for MOTT effective August 1. This change for MOTT applies only to pharmacy services and does **not** pertain to continued laboratory services. Also, the state will continue to provide medications for the treatment of tuberculosis disease or infection.

We regret and apologize for any inconvenience that may arise as a result of this necessary program change. If you have any questions concerning this information, please call the Bureau of Tuberculosis Control at 314/751-6122.

Upcoming Conference

INFECTION CONTROL — WHAT IS IT?

October 23-25, 1991
Holiday Inn - Lake Ozark

Purpose
This three-day conference will begin to prepare healthcare professionals as resource persons and facilitators for prevention and control of the most common nosocomial infections.

It will also help the professional develop skills in managing the everyday responsibilities of infection surveillance, analysis of disease data, and solving infection control problems in the facility.

Contact Hours
Application has been submitted for contact hours for RN's, LPN's, medical technologists/microbiologists, nursing home administrators, and sanitarians.

Sponsors
Co-sponsored by the Missouri Department of Health and nine other organizations.

Registration
For complete agenda and registration form, call (314) 751-6115.

Missouri EPIDEMIOLOGIST

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The Managing Editor is H. Denny Donnell, Jr., MD, MPH, State Epidemiologist, assisted by an Editorial Board including Bill Schmidt, MPH, Director, and Hilda Chaski, MPH, Deputy Director of the Division of Environmental Health and Epidemiology. Diane C. Rackers is the Production Manager. Questions or comments should be directed to (314) 751-6128 or toll free (800) 392-0272.

Missouri
EPIDEMIOLOGIST

Volume XIII, Number 4 *July-August 1991*

Department of Health Recommendations for Preventing HIV/HBV Transmission from Health Care Worker to Patient

After meeting July 22 with public health representatives from the major metropolitan areas in Missouri, the Department of Health adopted the Centers for Disease Control (CDC) guidelines as published July 12 and drafted additional recommendations. It is important to note that the CDC guidelines are consistent with, but more specific than, those issued by the American Medical Association and American Dental Association earlier this year. We have reprinted the CDC guidelines on the following pages (2-4 and 13-15) of this newsletter, which can be easily separated for reference.

The department recommends:

- that patients discuss concerns about HIV transmission with their dentist or physician before undergoing an invasive procedure. Current Missouri law already requires that HIV-infected patients notify their health care professional before receiving services;

- that health care providers who perform exposure-prone invasive procedures be tested voluntarily for HIV and HBV. These procedures are described as those in which the worker has a relatively high likelihood of being cut or injured, permitting his or her blood to come in contact with a patient's tissues or mucous membranes;

- that health care workers infected with HIV or HBV (and are HBeAg positive) discontinue exposure-prone procedures, or if desiring to continue these procedures, they should have their practices and procedures examined by an independent review panel. In every case, the infected providers performing these procedures are to notify their patients of their HIV/HBV-infection status;

- that all health care workers adhere to universal precautions and strict disinfection guidelines with all patients.

The department has adopted the CDC guidelines as the minimum acceptable standard of medical and dental practice to be adhered to in order to prevent the transmission of HIV or HBV from an infected health care worker to a patient. As such, as a duty under current public health statutes, the department may be forced to intervene in a medical or dental practice to protect the public health by limiting the practice of any provider obviously creating a grave and unjustifiable risk of infection to patients. In addition, the department will:

- investigate complaints against health care workers known to be infected with HIV or HBV who may have exposed patients during exposure-prone procedures;

- when appropriate, confidentially notify patients who may have been exposed to infection from health care workers through exposure-prone events.

Because of the extremely low probability of this type of transmission, the decision to notify patients of HIV-infected health care workers must be made on a case-by-case basis and must be based on whether they underwent an exposure-prone procedure. Both the review of professional practice and notification of patients will be confidential. These recommendations, based on a comprehensive review of epidemiological and scientific studies, do not call for mandatory testing nor disclosure in all health care workers or for all invasive procedures, but apply only to those actually performing exposure-prone procedures.

(continued on page 2)

Inside this Issue...

DOH Health Care Worker Guidelines (continued)

Before issuing these recommendations, the department working with CDC and other state and local health departments, has been actively involved in assessing the potential for transmission from health care worker to patient. As part of these efforts, local health departments have begun to systematically review the practice environments of several deceased HIV-infected providers. Such reviews have included examining the type of procedures performed, the use of barrier precautions, and any evidence of impairment which might have affected the physician's or dentist's ability to practice with sound judgement and ability.

CDC has estimated that even when a health care worker is infected with HIV and performs invasive procedures, the risk for transmission is extremely low. Although there have been more than 180,000 cases of AIDS nationwide, to date health care worker-to-patient transmission has been implicated in the case of only one dentist. In Missouri, documented HIV transmission has been confined to sexual contact, needle-sharing, receipt of an infected blood product, or birth to an infected mother. In Missouri, all situations in which the mode of HIV transmission is unknown are thoroughly investigated. Among the more than 5,000 reported cases of AIDS or HIV infection, health care worker-to-patient transmission has not been documented.

Because of the complexities of these issues, monitoring and support for the HIV-infected medical or dental provider will necessitate close cooperation between state and local health departments, professional societies, hospitals and health care institutions, licensing boards, and individual practicing providers. The department has met with representatives of the dental, medical and osteopathic professional societies and hospital association. Duties accepted by the professional societies include:

- working with their respective national organizations in more clearly identifying "exposure prone" invasive procedures;
- providing recommendations on measures health care workers need to take to remain aware of their HIV/HBV-infection status.

The department will continue to work with these groups to develop final recommendations.

Individual practitioners licensed by the Missouri Dental Board or Board of Registration for the Healing Arts also need to recognize their responsibilities. These duties include taking proper precautions to guard against the spread of communicable disease while performing professional services. Licensed physicians are also required to report to their Board their knowledge of the existence of an unsanitary condition in the office of another physician, or in any health care facility. Finally, should an HIV-infected health professional demonstrate signs of cognitive or neurologic impairment which might pose a risk to his or her patients, he or she should be treated like any other impaired health professional.

HIV-infected physicians and dentists may contact their professional societies, medical or dental institutions, their local health department or the Missouri Department of Health for more information.

CDC Recommendations for Preventing Transmission of Human Immunodeficiency Virus and Hepatitis B Virus to Patients During Exposure-Prone Invasive Procedures

Reprinted from Morbidity and Mortality Weekly Report Supplement, July 12, 1991, Vol. 40, No. RR-8

This document has been developed by the Centers for Disease Control (CDC) to update recommendations for prevention of transmission of human immunodeficiency virus (HIV) and hepatitis B virus (HBV) in the health-care setting. Current data suggest that the risk for such transmission from a health-care worker (HCW) to a patient during an invasive procedure is small; a precise assessment of the risk is not yet available. This document contains recommendations to provide guidance for prevention of HIV and HBV transmission during those invasive procedures that are considered exposure-prone.

Introduction

Recommendations have been made by the Centers for Disease Control (CDC) for the prevention of transmission of the human immunodeficiency virus (HIV) and the hepatitis B virus (HBV) in health-care settings (1-6). These recommendations emphasize adherence to universal precautions that require that blood and other specified body fluids of **all** patients be handled as if they contain bloodborne pathogens (1,2).

Previous guidelines contained precautions to be used during invasive procedures (defined in Appendix) and recommendations for the management of HIV- and HBV-infected health-care workers (HCWs) (1). These guidelines did not include specific recommendations on testing HCWs for HIV or HBV infection, and they did not provide guidance on which invasive procedures may represent increased risk to the patient.

The recommendations outlined in this document are based on the following considerations:

- Infected HCWs who adhere to universal precautions and who do not perform invasive procedures pose no risk for transmitting HIV or HBV to patients.
- Infected HCWs who adhere to universal precautions and who perform certain exposure-prone procedures (see page 4) pose a small risk for transmitting HBV to patients.
- HIV is transmitted much less readily than HBV.

In the interim, until further data are available, additional precautions are prudent to prevent HIV and HBV transmission during procedures that have been linked to HCW-to-patient HBV transmission or that are considered exposure-prone.

Background

Infection-Control Practices

Previous recommendations have specified that infection-control programs should incorporate principles of universal precautions (i.e., appropriate use of hand washing, protective barriers, and care in the use and disposal of needles and other sharp instruments) and should maintain these precautions rigorously in all health-care settings (1,2,5). Proper application of these principles will assist in minimizing the risk of transmission of HIV or HBV from patient to HCW, HCW to patient, or patient to patient.

As part of standard infection-control practice, instruments and other reusable equipment used in performing invasive procedures should be appropriately disinfected and sterilized as follows (7):

- Equipment and devices that enter the patient's vascular system or other normally sterile areas of the body should be sterilized before being used for each patient.
- Equipment and devices that touch intact mucous membranes but do not penetrate the patient's body surfaces should be sterilized when possible or undergo high-level disinfection if they cannot be sterilized before being used for each patient.
- Equipment and devices that do not touch the patient or that only touch intact skin of the patient need only be cleaned with a detergent or as indicated by the manufacturer.

Compliance with universal precautions and recommendations for disinfection and sterilization of medical devices should be scrupulously monitored in all health-care settings (1, 7, 8). Training of HCWs in proper infection-control technique should begin in professional and vocational schools and continue as an ongoing process. Institutions should provide all HCWs with appropriate inservice education regarding infection control and safety and should establish procedures for monitoring compliance with infection-control policies.

All HCWs who might be exposed to blood in an occupational setting should receive hepatitis B vaccine, preferably during their period of professional training and before any occupational exposures could occur (8, 9).

Transmission of HBV During Invasive Procedures

Since the introduction of serologic testing for HBV infection in the early 1970s, there have been published reports of 20 clusters in which a total of over 300 patients were infected with HBV in association with treatment by an HBV-infected HCW. In 12 of these clusters, the implicated HCW did not routinely wear gloves; several HCWs also had skin lesions that may have facilitated HBV transmission (10-22). These 12 clusters included nine linked to dentists or oral surgeons and one cluster each linked to a general practitioner, an inhalation therapist, and a cardiopulmonary-bypass-pump technician. The clusters associated with the inhalation therapist and the cardiopulmonary-bypass-pump technician—and some of the other 10 clusters—could possibly have been prevented if current recommendations on universal precautions, including glove use, had been in effect. In the remaining eight clusters, transmission occurred despite glove use by the HCWs; five clusters were linked to obstetricians or gynecologists, and three were linked to cardiovascular surgeons (6, 22-28). In addition, recent unpublished reports strongly suggest HBV transmission from three surgeons to patients in 1989 and 1990 during colorectal (CDC, unpublished data), abdominal, and cardiothoracic surgery (29).

Seven of the HCWs who were linked to published clusters in the United States were allowed to perform invasive procedures following modification of invasive techniques (e.g., double gloving and restriction of certain high-risk procedures) (6,11- 13,15,16, 24). For five HCWs, no further transmission to patients was observed. In two instances involving an obstetrician/gynecologist and an oral surgeon, HBV was transmitted to patients after techniques were modified (6, 12).

Review of the 20 published studies indicates that a combination of risk factors accounted for transmission of HBV from HCWs to patients. Of the HCWs whose hepatitis B e antigen (HBeAg) status was determined (17 of 20), all were HBeAg positive. The presence of HBeAg in serum is associated with higher levels of circulating virus and therefore with greater infectivity of hepatitis-B-surface-antigen (HBsAg)-positive individuals; the risk of HBV transmission to an HCW after a percutaneous exposure to HBeAg-positive blood is approximately 30% (30-32). In addition, each report indicated that the potential existed for contamination of surgical wounds or trau-

matized tissue, either from a major break in standard infection-control practices (e.g., not wearing gloves during invasive procedures) or from unintentional injury to the infected HCW during invasive procedures (e.g., needle sticks incurred while manipulating needles without being able to see them during suturing).

Most reported clusters in the United States occurred before awareness increased of the risks of transmission of blood-borne pathogens in health-care settings and before emphasis was placed on the use of universal precautions and hepatitis B vaccine among HCWs. The limited number of reports of HBV transmission from HCWs to patients in recent years may reflect the adoption of universal precautions and increased use of HBV vaccine. However, the limited number of recent reports does not preclude the occurrence of undetected or unreported small clusters or individual instances of transmission; routine use of gloves does not prevent most injuries caused by sharp instruments and does not eliminate the potential for exposure of a patient to an HCW's blood and transmission of HBV (6, 22-29).

Transmission of HIV During Invasive Procedures

The risk of HIV transmission to an HCW after percutaneous exposure to HIV-infected blood is considerably lower than the risk of HBV transmission after percutaneous exposure to HBeAg-positive blood (0.3% versus approximately 30%) (33-35). Thus, the risk of transmission of HIV from an infected HCW to a patient during an invasive procedure is likely to be proportionately lower than the risk of HBV transmission from an HBeAg-positive HCW to a patient during the same procedure. As with HBV, the relative infectivity of HIV probably varies among individuals and over time for a single individual. Unlike HBV infection, however, there is currently no readily available laboratory test for increased HIV infectivity.

Investigation of a cluster of HIV infections among patients in the practice of one dentist with acquired immunodeficiency syndrome (AIDS) strongly suggested that HIV was transmitted to five of the approximately 850 patients evaluated through June 1991 (36-38). The investigation indicates that HIV transmission occurred during dental care, although the precise mechanisms of transmission have not been determined. In two other studies, when patients cared for by a general surgeon and a surgical resident who had AIDS were tested, all patients tested, 75 and 62, respectively, were negative for HIV infection (39, 40). In a fourth study, 143 patients who had been treated by a dental student with HIV infection and were later tested were all negative for HIV infection (41). In another investigation, HIV antibody testing was offered to all patients whose surgical procedures had been performed by a general surgeon within 7 years before the surgeon's diagnosis of AIDS; the date at which the surgeon became infected with HIV is unknown (42). Of 1,340 surgical patients contacted, 616 (46%) were tested for HIV. One patient, a known intravenous drug user, was HIV positive when tested but may already have been infected at the time of surgery. HIV test results for the 615 other surgical patients were negative (95% confidence interval for risk of transmission per operation=0.0%-0.5%).

The limited number of participants and the differences in procedures associated with these five investigations limit the ability to generalize from them and to define precisely the risk of HIV transmission from HIV-infected HCWs to patients. A precise estimate of the risk of HIV transmission from infected HCWs to patients can be determined only after careful evaluation of a substantially larger number of patients whose exposure-prone procedures have been performed by HIV-infected HCWs.

Exposure-Prone Procedures

Despite adherence to the principles of universal precautions, certain invasive surgical and dental procedures have been implicated in the transmission of HBV from infected HCWs to patients, and should be considered exposure-prone. Reported examples include certain oral, cardiothoracic, colorectal (CDC, unpublished data), and obstetric/gyneco-logic procedures (6, 12, 22-29).

Certain other invasive procedures should also be considered exposure-prone. In a prospective study CDC conducted in four hospitals, one or more percutaneous injuries occurred among surgical personnel during 96 (6.9%) of 1,382 operative procedures on the general surgery, gynecology, orthopedic, cardiac, and trauma services (43). Percutaneous exposure of the patient to the HCW's blood may have occurred when the sharp object causing the injury recontacted the patient's open wound in 28 (32%) of the 88 observed injuries to surgeons (range among surgical specialties=8%-57%; range among hospitals=24%-42%).

Characteristics of exposure-prone procedures include digital palpation of a needle tip in a body cavity or the simultaneous presence of the HCW's fingers and a needle or other sharp instrument or object in a poorly visualized or highly confined anatomic site. Performance of exposure-prone procedures presents a recognized risk of percutaneous injury to the HCW, and—if such an injury occurs—the HCW's blood is likely to contact the patient's body cavity, subcutaneous tissues, and/or mucous membranes.

Experience with HBV indicates that invasive procedures that do not have the above characteristics would be expected to pose substantially lower risk, if any, of transmission of HIV and other blood-borne pathogens from an infected HCW to patients.

(continued on page 13)

Missouri EPIDEMIOLOGIST

Pull Out Section The inner section of this issue can be removed allowing a full copy of the health care worker guidelines to be retained for separate reference.

Volume XIII, Number 4 *July-August 1991*

Tuberculosis in an Elementary School

H. Denny Donnell, Jr, MD, MPH
Office of Epidemiology

Vic Tomlinson, MPA
Bureau of Tuberculosis Control

Linda A. Fisher, MD
St. Louis County DOCHMC

Douglas R. Dodson
Eastern District Health Office

In May, 1990, an outbreak of tuberculosis was discovered in an elementary school in St. Louis County, Missouri. The county health department had been informed of three children with tuberculosis infection or disease from one school and had initiated an investigation just prior to the time when a 42 year-old white male school employee was admitted to a local hospital in May with extensive cavitary tuberculosis. He had acid fast bacilli on smear and was eventually culture proven. He had a history of a positive Mantoux skin test since childhood when his mother was treated for tuberculosis. He was screened with yearly chest x-rays from his employment in 1972 until 1983 when this practice was no longer recommended. Isoniazid (INH) preventive therapy was never recommended to him.

The employee's close contact with a majority of students and staff members resulted in high attack rates. Among 343 students, 176 (51.3%) were infected and 32 (9.3%) were found to have tuberculosis disease. Among the staff 13 out of 49 (26.5%) were infected but no additional cases of tuberculosis were found. The initial skin testing during the days immediately after the discovery of the index case yielded an infection rate of 46.6% (160/343) among the students. The follow-up testing that was conducted three months later resulted in a late conversion rate of 8.7% (16/183). Among the staff, the initial rate of infection was 10.2% (5/49). Three months later the follow-up testing resulted in a late conversion rate of 18.2% (8/44).

INH preventive treatment was given to children with positive skin tests and preventive treatment was also recommended for those who were skin test negative. Three months of preventive treatment was recommended for those children who remained negative after the three month follow-up skin test was administered. However, six months of preventive treatment was recommended for those children who converted from negative to positive on the follow-up test three months later. There were 288 out of 343 children (84.0%) placed on treatment. Testing was extended to 7th graders and 8th graders who had attended this school during the previous one or two years. The infection rate in 7th graders was 8.0% (2/25) and none of the 21 8th graders tested were infected. Testing of school employees in the district revealed that 3.7% (50/1335) were infected. The attack rate in other district employees who had contact with the index case was 17.4% (8/46). In addition, an investigation was conducted of transmission within households of chil-

(continued on page 6)

Tuberculosis Infection Reporting Card Now Available

Vic Tomlinson, MPA
Bureau of Tuberculosis Control

The new reporting card for tuberculosis infection (TBC-4) is now being distributed. The Department of Health filed a rule change to make tuberculosis infection a reportable condition in Missouri effective March 14, 1991. This change was undertaken in order to prevent future cases of tuberculosis and eliminate the disease by the year 2010. Persons who are found to be infected with tuberculosis by skin testing should be reported to the local health department utilizing the TBC-4 card.

The new reporting cards can be obtained by contacting local health departments. Questions concerning this new process should be directed to the local health department or by calling the Bureau of Tuberculosis Control at (314) 751-6122.

dren with active tuberculosis. The data indicated that these children were not infectious. Of 114 family contacts of the 32 children with active disease, only 5 (4.4%) were skin test positive. This rate is similar to that of non-exposed populations in St. Louis.

Letters were sent to 651 persons who may have been exposed to the index case during a conference held in November, 1989 advising them to have a Mantoux skin test as soon as possible. The letters were sent in November, 1990 and as of April, 1991, responses had been received from 290 individuals (44.5%). Among the 278 who were tested 5 (1.8%) were newly identified as positive at 5 or greater millimeters of induration and 273 (98.2%) were negative. There were 7 persons responding who had a previously known infection and 5 who had not had the skin test performed.

The investigation did not reveal any difference in the rate of infection by sex among the children. In contrast, among staff persons, the male sex was a significant risk factor for infection. This risk seemed to be due to contact with the index case. Four of the five male staff members who were positive on skin test worked in offices that were adjacent to the location where the index case worked.

The potential of transmission from a highly infectious patient underscores the importance of extensive contact investigation, INH preventive treatment, and evaluation and treatment of disease. The substantial number of late conversions emphasizes the importance of repeat testing of contacts with initially negative reactions.

Questions concerning this report should be directed to the Bureau of Tuberculosis Control at (314) 751-6122.

Reference:

Hoge C W, Fisher L A, Donnell H D, Tomlinson G V, Bloch A, Breiman R. Outbreak of tuberculosis in an elementary school, Missouri. Epidemic Intelligence Service 40th Annual Conference, Atlanta Georgia, 1991;52

AIDS Knowledge, Attitude, Belief and Behavior

DeeAnn Finley
Bureau of AIDS Prevention

The Bureau of AIDS Prevention houses a Health Education/Risk Reduction program which reaches into the cities and rural areas of Missouri with education and prevention messages to slow the spread of AIDS.

The main goals and objectives of the Bureau's HE/RR program are:

- to reduce the spread of HIV infection by targeting culturally-sensitive, risk-reduction messages to persons engaging in high-risk behaviors.
- to provide information to persons already infected in an effort to help them maintain their health and protect the health of others.
- to provide information to the general public in an effort to increase awareness of the risk of HIV infection, reduce the myths surrounding HIV and increase the general public's compassion for and awareness of those with HIV infection and AIDS.

Local health and community based organizations serve as effective vehicles for distributing HE/RR messages with funds provided through contracts with the Bureau. One such vehicle is the Missouri AIDS Speakers Bureau contracted to the Mid Missouri AIDS Project headquartered in Columbia.

The speakers bureau schedules professionals to present AIDS information to civic organizations, community groups, churches, healthcare professionals and schools. Persons whose lives have been affected by HIV also get the opportunity to share their personal experiences. The

Survey Results for IV Drug Users (both in and out of treatment)
(186 surveys returned--first quarter 1991)

Demographic Characteristics
75% Male 25% Female
74% Age 35 and under
67% White 25% Black 2% Hispanic 5% Native American 1% Other

Knowledge about transmission
92% Know HIV/AIDS can be transmitted through sexual intercourse
94% Know HIV/AIDS can be transmitted by sharing needles for IV drug use
90% Know proper use of a condom during sex can help prevent transmission of HIV/AIDS
90% Know HIV/AIDS can be transmitted from a pregnant woman to her baby
52% Know donating blood is NOT a risk factor
90% Know they cannot get HIV/AIDS from a public toilet
66% Know mosquitos and other insects cannot transmit HIV/AIDS
67% Know they cannot get HIV/AIDS from eating in a restaurant where the cook has AIDS
95% Know if they think they might have AIDS, they should be tested

Behavior
83% Are sexually active with an average of four sex partners within the past six months
65% Share works (needles)
88% Have had sex while high on drugs
30% Trade sex for drugs and/or money
11% Have had a sexually transmitted disease within the past year

Survey Results for Women of Childbearing Age (423 surveys returned--first quarter 1991)

Demographic Characteristics

69% White 27% Black 3% Hispanic 1% Native American 2% Other

Knowledge about transmission

92% Know HIV/AIDS can be transmitted through sexual intercourse
95% Know HIV/AIDS can be transmitted by sharing needles for IV drug use
90% Know proper use of a condom during sex can help prevent transmission of HIV/AIDS
94% Know HIV/AIDS can be transmitted from a pregnant woman to her baby
54% Know donating blood is NOT a risk factor
88% Know they cannot get HIV/AIDS from a public toilet
60% Know mosquitos and other insects cannot transmit HIV/AIDS
75% Know they cannot get HIV/AIDS from eating in a restaurant where the cook has AIDS
95% Know if they think they might have AIDS, they should be tested

Behavior

70% Are sexually active with an average of 1.6 sex partners within the past six months
42% Never use a condom during sex
17% Have traded sex for money or drugs
8% Have had an STD within the past year
15% Use IV drugs, and of those users, 64% share needles and other works

Survey Results for Blacks, Hispanics and Native Americans (338 surveys returned--first quarter 1991)

Demographic Characteristics

54% Male 46% Female
82% Black 7% Hispanic 8% Native American 3% Other

Knowledge about transmission

92% Know HIV/AIDS can be transmitted through sexual intercourse
93% Know that HIV/AIDS can be transmitted by sharing needles for IV drug use
88% Know proper use of a condom during sex can help prevent transmission of HIV/AIDS
92% Know HIV/AIDS can be transmitted from a pregnant woman to her baby
46% Know donating blood in NOT a risk factor
85% Know they cannot get HIV/AIDS from a public toilet
64% Know mosquitos and other insects cannot transmit HIV/AIDS
65% Know they cannot get HIV/AIDS from eating in a restaurant where the cook has AIDS
93% Know if they think they might have AIDS, they should be tested

Behavior

72% Are sexually active with an average of three sex partners within the past six months
18% Have a history of IV drug use
26% Have traded sex for money or drugs
11% Have had an STD within the past year

speakers bureau reached 4,155 people through 90 presentations during 1990.

The Bureau contracts with city health departments and community based organizations in Kansas City, St. Louis, Columbia and Springfield to provide "grass roots" AIDS prevention messages. These organizations reach the local population engaging in high-risk behavior with culturally sensitive risk-reduction messages.

The Bureau monitors the effectiveness of HE/RR activities by measuring the knowledge, attitude, belief and behavior (KABB) of specific target populations specified in Centers for Disease Control objectives. KABB surveys reach participants in educational presentations and persons utilizing state health services. Survey results from the first quarter (January-March, 1991) KABB survey are shown in boxes accompanying this article.

The Bureau's HE/RR program supplies tens of thousands of AIDS brochures and pamphlets each quarter targeted at teens, women, drug users, children and other audiences to heighten the awareness of the AIDS epidemic. Posters, books and audiovisual materials are also available for a variety of audiences.

A toll-free information line (800) 533-AIDS in Jefferson City answers approximately 400 calls each quarter. The Bureau staff answers questions about transmission (11%), testing (21%), symptoms (16%), resources (19%), statistics (6%), treatment (6%), legal concerns (6%) and general AIDS information (15%). Several of the Bureau contracted agencies also operate local hotlines to answer concerns about HIV and AIDS.

As the Bureau recognizes populations which lack specific knowledge and education about HIV and AIDS, efforts are made to reach those people with messages about prevention.

For more information on HE/RR, contact: DeeAnn Finley, Bureau of AIDS Prevention, P.O. Box 570, Jefferson City, MO 65102. Phone (314) 751-6438.

Isolation of Toxigenic *Vibrio cholerae* from the U.S. Gulf Coast

Toxigenic *Vibrio cholerae* 01, biotype El Tor, serotype Inaba has been confirmed in a sample of pooled oysters obtained about 4 miles offshore from Mobile, Alabama. The oysters were taken from a closed commercial oyster bed in 10 feet of water. These isolates appear to be similar to the recently identified Latin American strains and are not the endemic Gulf Coast strain. To date, no human illness has been identified.

All commercial oyster beds in Alabama are already closed for the summer season for conservation purposes. As a result of these findings, three private beds have also been closed, and the public warned of the hazard of poaching oysters from closed beds. The FDA is planning to culture oysters in other commercial harvest areas of the Gulf Coast to look for toxigenic *V. cholerae* 01.

Large numbers of cases continue to be reported from the Amazon jungle areas of Peru, and from Ecuador and Colombia. As of July 24, 1991, over 250,000 probable cases and 2,922 deaths were reported from this area. A total of 257 confirmed cases have been reported from five Mexican states; the northernmost is the state of Veracruz.

Since imported or raw shellfish-associated cases can potentially occur anywhere, we encourage physicians to include *V. cholerae* in their differential diagnosis of severe watery diarrhea and to promptly report suspect or confirmed cases to their local health unit or the Missouri Department of Health, Phone (800) 392-0272.

Information in this article was adapted from a public health network message from the Centers for Disease Control dated August 7, 1991.

Consider Cholera

Cholera is on the rise in Central and South America. Physicians in the United States need to be on the lookout for potential cases.

What is cholera?

Cholera is an acute bacterial enteric disease with sudden onset of profuse watery diarrhea and vomiting. If severe, it can quickly lead to severe dehydration, shock, acidosis, and death in a matter of hours.

When should I suspect cholera?

You should suspect cholera in any patient presenting with severe watery diarrhea and vomiting with severe dehydration. The patient may complain of painful cramping in the legs due to electrolyte disturbances. Clinical suspicion should be increased, and milder diarrheal illnesses are more suspect in persons returning from areas known to have epidemic cholera, or in persons with a recent history of ingestion of raw seafood.

How do I diagnosis cholera?

The diagnosis is made by culturing the organism from the stool. Notify your lab that you are considering cholera so that they will culture on TCBS agar. However, you do not need to wait for a positive culture before starting aggressive treatment.

How do I treat cholera?

The severe cholera patient has lost more than 10% of body weight and needs swift volume replacement. Cholera deaths can be prevented by the aggressive administration of fluids. This will correct the dehydration, shock, and acidosis. Antibiotic treatment is less important, but will decrease the duration of illness.

What fluids should I give?

This depends on the patient's condition. Patients with mild to moderate dehydration can be given an appropriate oral rehydration solution such as Ricelyte (tm), Rehydralyte (tm) or WHO ORS*. These are the only solutions currently available in the United States that contain the proper balance of electrolytes.

Patients with severe dehydration or those with intractable vomiting need intravenous therapy with Lactated Ringers solution. Intravenous fluid should be given quickly to restore the circulation, then oral fluids be given as soon as possible.

How much fluid should I give?

Fluid therapy needs to be individualized. Severely dehydrated adults may require several liters of fluid immediately to restore an adequate circulating volume. Base your therapy on the degree of dehydration. Remember that cholera patients will have significant on-going fluid losses that also need to be replaced.

Consider Cholera
(continued)

What antibiotic should I use?

In cases of confirmed cholera, or for suspected cases during an outbreak, the following antibiotics are acceptable:

Tetracycline
Adult: 500 mg, 4 times/day for 3 days
Child: 12.5 mg/kg, 4 times/day for 3 days

Doxycycline
Adult: 300 mg as a one time dose
Child: 6 mg/kg as a one time dose

Furazolidone
Adult: 100 mg, 4 times/day for 3 days
Child: 1.25 mg/kg, 4 times/day for 3 days

Trimethoprim-Sulfamethoxazole (TMP-SMX)
Adult: 160 mg as TMP, 2 times/day for 3 days
Child: 5 mg/kg as TMP, 2 times/day for 3 days

Erythromycin
Adult: 250 mg, 4 times/day for 3 days
Child: 10 mg/kg, 3 times/day for 3 days

What else should I do?

All suspected or confirmed cases of cholera should be reported to your local or state health department immediately.

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* WHO Formula Oral Rehydration Salts can be ordered from:
Mr. Greg Jianas
Jianas Bros. Packaging Co.
2533 S. W. Blvd.
Kansas City, MO 64108
Phone (816) 421-2880
FAX (816) 421-2883

Office of Epidemiology Created

Denny Donnell, MD, MPH was recently appointed Director of the Office of Epidemiology within the Division of Environmental Health and Epidemiology. This new unit will investigate and assist other units in the Division by investigating and evaluating public health issues in a scientifically sound and epidemiologically based manner. Their findings should assist the development of appropriate policies and public health interventions.

The staff will work with the Division and Bureau administrators to develop projects which will clarify various health related issues and guide policy development. The Office will provide epidemiologic consultation upon request to other units of state and local public health agencies and will provide training courses and presentations regarding various aspects of epidemiology.

The Office includes Todd Baumgartner, MD, MPH who is primarily responsible for the epidemiology and surveillance of HIV/AIDS, Patrick Phillips, DVM, MSPH who is a consultant epidemiologist working primarily with environmental studies and Karen Northup, RN, MPH who is a consultant nurse. Epidemic Intelligence Service Officer, Carol Friedman, DO is assigned to the Office to conduct investigations of acute outbreaks in the state and to perform other epidemiologic investigations. The Bureau of Communicable Disease Control under the direction of Mahree Bright, MA, is also under the supervision of Dr. Donnell and works closely with the other professionals in the Office.

State Public Health Laboratory Report

Newborn Screening — Hypothyroidism, Phenylketonuria, Galactosemia and Hemoglobinopathies

James Baumgartner, BS, MBA, Chief, Metabolic Disease Unit

	May 91	June 91	Total YTD
Specimens Tested	10,282	9,437	56,837
Initial (percent)	71.1%	67.8%	39,790
Repeat (percent)	28.9%	32.2%	17,047
Specimens: Unsatisfactory	132	116	756
HT Borderline	324	347	1,794
HT Presumptive	11	7	41
PKU Borderline	10	24	87
PKU Presumptive Positive	1	0	4
GAL Borderline	229	226	584
GAL Presumptive Positive	3	5	26
FAS (Sickle cell trait)	88	103	625
FAC (Hb C trait)	21	26	154
FAX (Hb variant)	17	17	92
FS (Sickle cell disease)	1	1	11
FSC (SC disease)	2	1	8
FC (Hb C disease)	1	0	4

HT = Hypothyroidism, PKU = Phenylketonuria, GAL = Galactosemia, Hb = Hemoglobin, SC = Sickle Cell, YTD = Year to Date

1990-91 Influenza Summary

Irene Donelon, RN
Bureau of Communicable Disease Control

In general, influenza activity was considerably lower this season than last, including intensity, duration, morbidity and mortality. A total of 186 cases of influenza were confirmed in Missouri during the 1990-91 season. Of these, 127 (68.3%) were type B, with 42 subtyped as B/Yamagata; 59 (31.7%) were type A, with 9 subtyped as A(H1N1) and one subtyped as A(H3N2).

Influenza-like illness peaked during week 10. The number of cases reported for the season was 32,084, which is considerably lower than the 42,000 reported during the 1989-90 season and the 1986-90 average of 38,603 (see Figure 1). Deaths from pneumonia and influenza, which are used to track the impact of influenza, also peaked during week 10. The total number of deaths this season was 987, which is very close to the 1983-90 average of 993, but considerably fewer than the 1,228 reported during the 1989-90 season (see Figure 2).

Outbreaks of influenza-like illness were reported in a long term care facility in the City of St. Louis and in schools in Johnson, St. Charles, and Gentry Counties.

The Department of Health extends its gratitude to all physicians who participated in this year's influenza laboratory surveillance project.

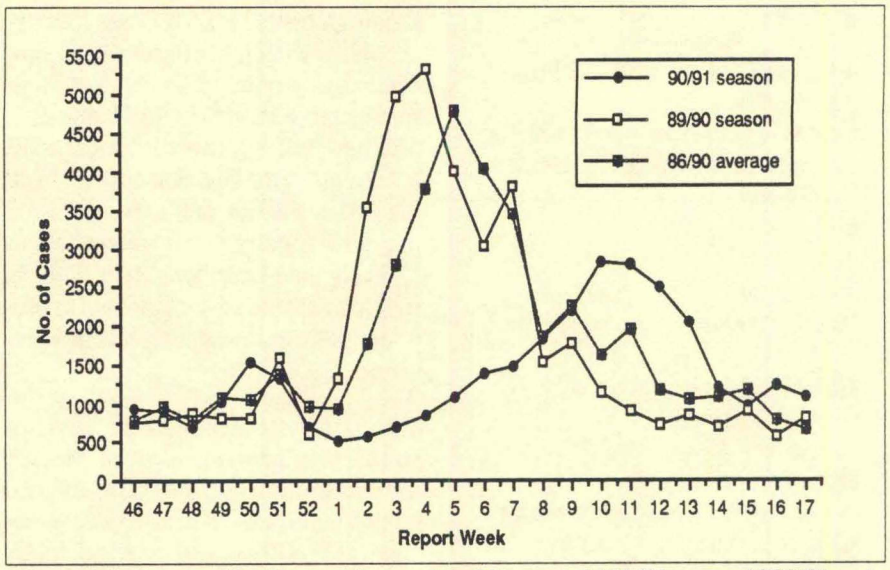


Figure 1. Influenza-like illnesses by week in Missouri, 1990/91 versus 1989/90 and 1986/90 average

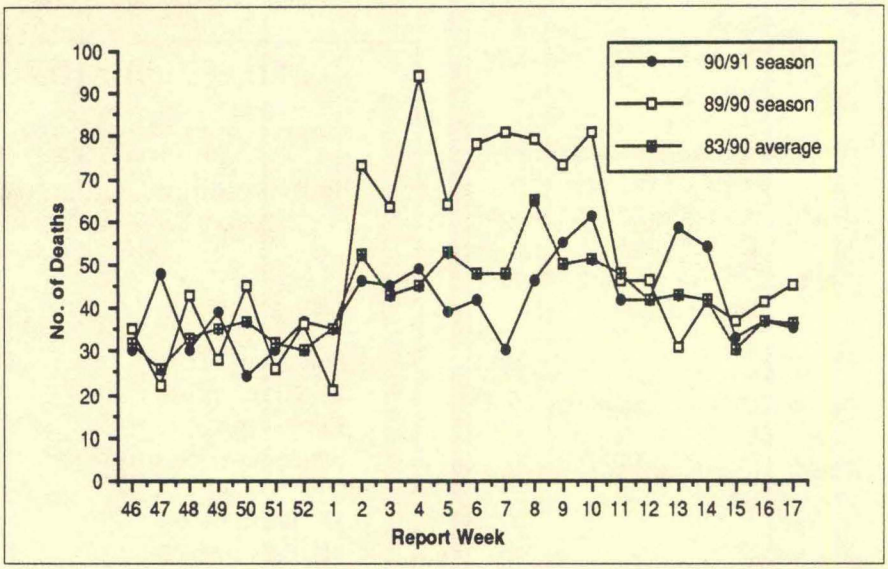


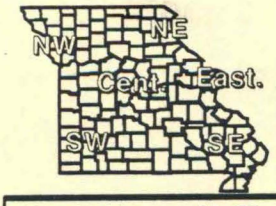
Figure 2. Influenza-like deaths by week in Missouri, 1990/91 versus 1989/90 and 1986/90 average

Optional Third Dose of OPV at Six Months Discouraged

Michael Klatt
Bureau of Immunization

Neither the American Academy of Pediatrics (AAP) nor the Immunization Practices Advisory Committee (ACIP) recommends the routine administration of the optional third dose of oral polio vaccine (OPV) at six months of age to infants in the United States. The 1991 "Red Book" (American Academy of Pediatrics *Report of the Committee of Infectious Diseases*) states, "Two doses produce an antibody response in excess of 90% to all three serotypes, and an additional dose at 6 months is usually not warranted. In geographic areas where polio is endemic, however, a third dose administered 2 months after the second dose is desirable." There has not been an endemic case of wild-virus paralytic polio in the the United States since 1979.

The Missouri Department of Health, like the other 49 state health departments, does not recommend the routine administration of the optional third dose of OPV at six months of age. Public and private health care providers should not use department-supplied OPV for the optional third dose at six months of age.



Missouri Department of Health
Disease Prevention - Communicable Disease Control

BIMONTHLY MORBIDITY REPORT

Reporting Period *
May - June, 1991

	Districts							KANSAS CITY	ST. LOUIS CITY	ST. LOUIS CO.	SPGFLD GREENE CO.	2 MONTH STATE TOTALS		CUMULATIVE		
	** NW	NE	CD	SE	** SW	** ED	*** OTHER					1991	1990	FOR 1991	FOR 1990	5 YR MEDIAN
Vaccine Preventable Dis.																
Chickenpox	425	152	211	367	253	310	0	0	0	0	4	1722	2837	6212	8798	6840
Diphtheria	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Hib Meningitis	1	0	1	0	0	0	0	1	1	0	0	4	22	22	57	67
Hib Other Invasive	3	0	4	0	4	0	0	0	0	0	0	11	10	33	20	**
Influenza	0	0	0	0	0	0	0	0	2	11	0	13	0	127	215	86
Measles	0	0	0	0	0	0	0	0	0	0	0	0	21	0	76	76
Mumps	0	0	0	2	0	3	0	1	0	0	0	6	7	24	43	30
Pertussis	0	0	2	1	0	0	0	0	0	1	1	5	11	25	31	14
Polio	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Rubella	0	2	0	1	0	0	0	0	0	0	0	3	0	4	0	0
Tetanus	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1
Viral Hepatitis																
A	15	2	21	15	1	2	0	20	13	14	1	104	79	351	279	279
B	17	1	22	7	6	4	0	10	15	2	5	89	127	244	306	300
Non A - Non B	13	0	3	3	4	1	0	14	7	2	0	47	8	138	24	20
Unspecified	0	0	0	0	0	0	0	0	0	0	0	0	4	3	11	10
Meningitis																
Aseptic	4	0	4	3	3	5	0	4	0	9	6	38	29	83	56	31
Meningococcal	0	1	3	0	0	1	0	0	1	3	0	9	7	28	19	20
Other	3	0	0	4	4	2	0	1	0	1	0	15	12	36	37	37
Enteric Infections																
Campylobacter	17	4	17	16	7	10	0	15	2	36	6	130	109	255	212	173
Salmonella	11	2	12	12	13	14	0	5	6	19	6	100	129	204	263	257
Shigella	2	1	1	2	4	1	0	14	3	4	0	32	44	70	95	95
Typhoid Fever	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	2
Parasitic Infections																
Amebiasis	1	0	0	0	0	0	0	0	2	0	0	3	4	10	8	8
Giardiasis	11	2	8	6	10	9	0	7	4	15	7	79	92	244	280	223
Sexually Transmitted Dis.																
AIDS	7	1	4	6	7	2	1	27	30	14	4	103	93	266	266	159
Gonorrhea	73	8	58	79	28	22	0	674	1742	564	25	3273	3265	8555	10093	7334
Genital Herpes	39	10	49	22	16	25	0	157	100	168	30	616	589	1752	1676	1013
Nongonoc. urethritis	14	14	46	20	0	0	0	334	639	400	0	1467	1466	3868	3572	3325
Prim. & Sec. syphilis	4	0	4	2	1	2	0	61	15	3	0	92	46	240	107	61
Tuberculosis																
Extrapulmonary	1	0	1	0	2	0	0	3	0	2	0	9	6	23	18	18
Pulmonary	1	1	2	5	7	1	0	3	3	4	2	29	50	90	116	115
Zoonotic																
Animal Bites	271	56	110	189	144	148	0	0	2	2	36	958	1427	1927	2949	1822
Psittacosis	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1
Rabies (Animal)	0	1	0	0	0	0	0	0	0	0	0	1	5	7	15	28
Rocky Mtn. Sp. Fever	0	0	1	3	2	0	0	0	0	0	1	7	9	8	12	12
Tularemia	0	1	6	6	4	0	0	0	0	0	1	18	10	22	13	13

Low Frequency Diseases

Anthrax
Botulism
Brucellosis
Chancroid - 1
Cholera
Cryptosporidiosis
Encephalitis (infectious) - 4
Encephalitis (viral/arbo-viral)
Granuloma Inguinale
Kawasaki Disease - 4
Legionellosis - 3
Leptospirosis
Lymphogranuloma Venereum
Malaria - 1
Plague
Rabies (human)
Reye's Syndrome
Rheumatic fever, acute
Toxic Shock Syndrome - 3
Trichinosis

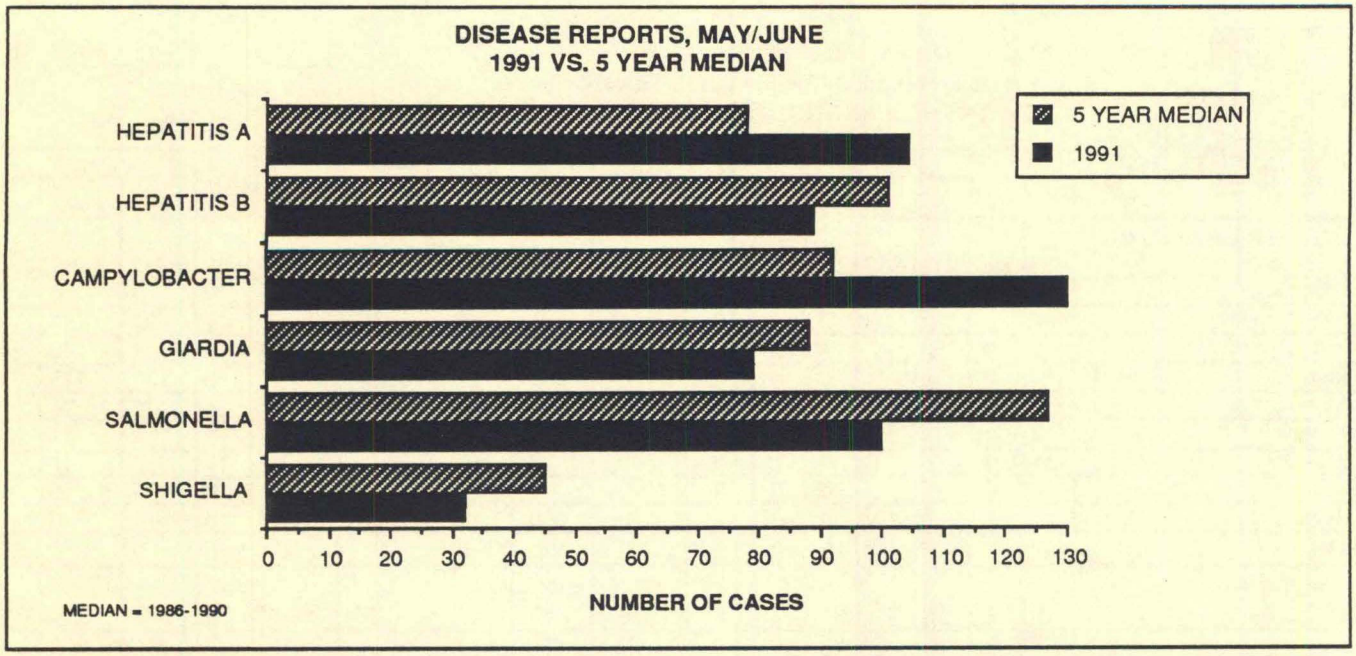
Outbreaks

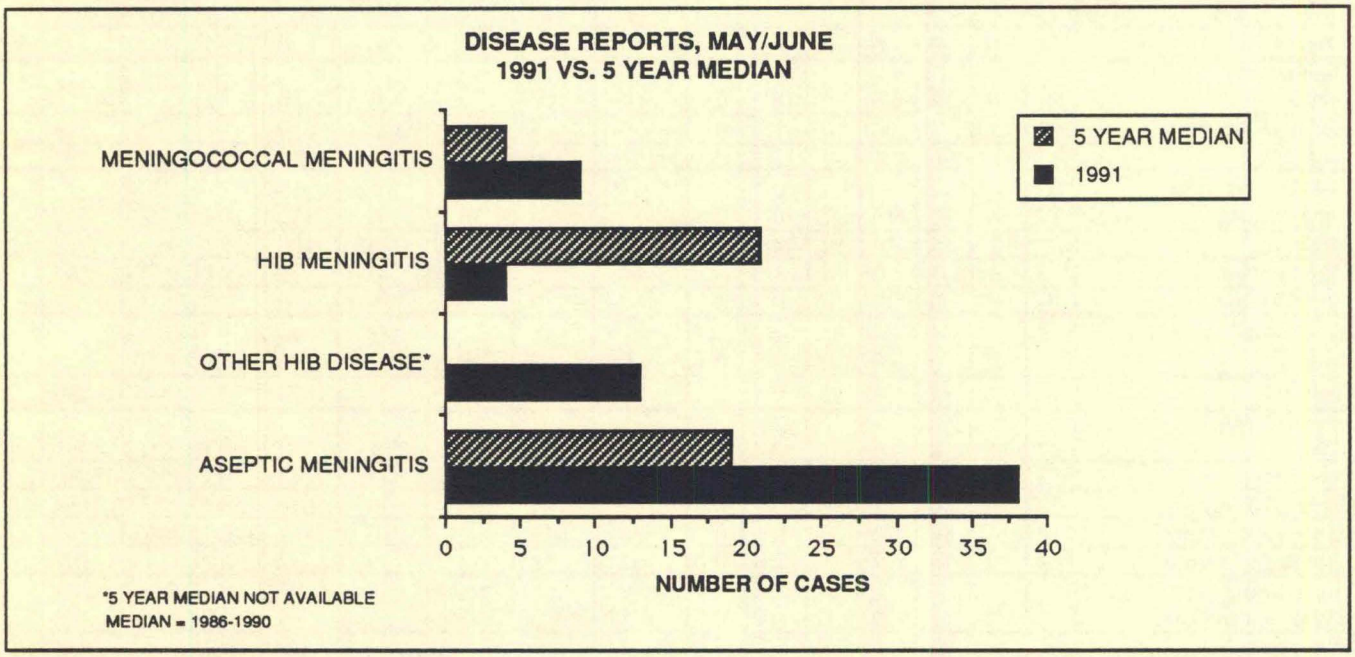
Foodborne - 6
Waterborne
Nosocomial - 3 (MRSA)
Pediculosis
Scabies - 3
Other - Acute
Gastrointestinal Illness - 1
Hepatitis A - 1
Salmonella - 1

*Reporting Period Beginning April 18, Ending June 29, 1991.
**Totals do not include KC, SLC, SLCo, or Springfield
***State and Federal Institutions
** Data not available

Due to data editing, totals may change.

TEAR OUT FOR FUTURE REFERENCE





ENTERICS

Campylobacter has increased 19.3% from 1990 to 1991 for the bimonthly period of May-June. Salmonella has shown a 22.5% decrease and Shigella has shown a 27.3% decrease when compared to the 1990 bimonthly period. Campylobacter has increased by 41.3% when compared to the bimonthly five year median. Other enterics have decreased when compared to their medians; Salmonella 21.3% and Shigella 28.8%.

MENINGITIS

Aseptic meningitis is up 31.0% and meningococcal meningitis is up 28.6% when compared to the 1990 bimonthly period. When compared to the bimonthly five year medians aseptic meningitis and meningococcal meningitis have shown increases of 100.0% and 125.0%.

HIB DISEASE

Hib meningitis is down 81.8% for the May-June 1991 period when compared to the 1990 period and down 80.9% when compared to the five year median. Other invasive Hib disease is up 10.0% from the 1990 period. There is no five year median for other invasive Hib disease at this time.

VIRAL HEPATITIS

Hepatitis A is up 31.6% from the 1990 bimonthly period and 33.3% from the five-year median. Hepatitis B decreased by 29.9% from the 1990 bimonthly period and was down 11.9% when compared to the five year median.

PARASITES

Giardia was down 14.1% from the 1990 bimonthly period and down 10.2% when compared to the median.

CDC Health Care Worker Guidelines (continued)

Recommendations

Investigations of HIV and HBV transmission from HCWs to patients indicate that, when HCWs adhere to recommended infection-control procedures, the risk of transmitting HBV from an infected HCW to a patient is small, and the risk of transmitting HIV is likely to be even smaller. However, the likelihood of exposure of the patient to an HCW's blood is greater for certain procedures designated as exposure-prone. To minimize the risk of HIV or HBV transmission, the following measures are recommended:

- **All HCWs should adhere to universal precautions, including the appropriate use of hand washing, protective barriers, and care in the use and disposal of needles and other sharp instruments. HCWs who have exudative lesions or weeping dermatitis should refrain from all direct patient care and from handling patient-care equipment and devices used in performing invasive procedures until the condition resolves. HCWs should also comply with current guidelines for disinfection and sterilization of reusable devices used in invasive procedures.**

- **Currently available data provide no basis for recommendations to restrict the practice of HCWs infected with HIV or HBV who perform invasive procedures not identified as exposure-prone, provided the infected HCWs practice recommended surgical or dental technique and comply with universal precautions and current recommendations for sterilization/disinfection.**

- **Exposure-prone procedures should be identified by medical/surgical/dental organizations and institutions at which the procedures are performed.**

- **HCWs who perform exposure-prone procedures should know their HIV antibody status. HCWs who perform exposure-prone procedures and who do not have serologic evidence of immunity to HBV from vaccination or from previous infection should know their HBsAg status and, if that is positive, should also know their HBeAg status.**

- **HCWs who are infected with HIV or HBV (and are HBeAg positive) should not perform exposure-prone procedures unless they have sought counsel from an expert review panel and been advised under what circumstances, if any, they may continue to perform these procedures.* Such circumstances would include notifying prospective patients of the HCW's seropositivity before they undergo exposure-prone invasive procedures.**

- **Mandatory testing of HCWs for HIV antibody, HBsAg, or HBeAg is not recommended. The current assessment of the risk that infected HCWs will transmit HIV or HBV to patients during exposure-prone procedures does not support the diversion of resources that would be required to implement mandatory testing programs. Compliance by HCWs with recommendations can be increased through education, training, and appropriate confidentiality safeguards.**

HCWS Whose Practices Are Modified Because of HIV or HBV Status

HCWs whose practices are modified because of their HIV or HBV infection status should, whenever possible, be provided opportunities to continue appropriate patient-care activities. Career counseling and job retraining should be encouraged to promote the continued use of the HCW's talents, knowledge, and skills. HCWs whose practices are modified because of HBV infection should be reevaluated periodically to determine whether their HBeAg status changes due to resolution of infection or as a result of treatment (44).

Notification of Patients and Follow-up Studies

The public health benefit of notification of patients who have had exposure-prone procedures performed by HCWs infected with HIV or positive for HBeAg should be considered on a case-by-case basis, taking into consideration an assessment of specific risks, confidentiality issues, and available resources. Carefully designed and implemented follow-up studies are necessary to determine more precisely the risk of transmission during such procedures. Decisions regarding notification and follow-up studies should be made in consultation with state and local public health officials.

Additional Needs

- Clearer definition of the nature, frequency, and circumstances of blood contact between patients and HCWs during invasive procedures.

- Development and evaluation of new devices, protective barriers, and techniques that may prevent such blood contact without adversely affecting the quality of patient care.

- More information on the potential for HIV and HBV transmission through contaminated instruments.

- Improvements in sterilization and disinfection techniques for certain reusable equipment and devices.

- Identification of factors that may influence the likelihood of HIV or HBV transmission after exposure to HIV- or HBV-infected blood.

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*The review panel should include experts who represent a balanced prespective. Such experts might include all of the following: a) the HCW's personal physician(s), b) an infectious disease specialist with expertise in the epidemiology of HIV and HBV transmission, c) a health professional with expertise in the procedures performed by the HCW, and d) state or local public health official(s). If the HCW's practice is institutionally based, the expert review panel might also include a member of the infection-control committee, preferably a hospital epidemiologist. HCW's who perform exposure-prone procedures outside the hospital/institutional setting should seek advice from appropriate state and local public health officials regarding the review process. Panels must recognize the importance of confidentiality and the privacy rights of infected HCW's.

APPENDIX

Definition of Invasive Procedure

An invasive procedure is defined as "surgical entry into tissues, cavities, or organs or repair of major traumatic injuries" associated with any of the following: "1) an operating or delivery room, emergency department, or outpatient setting, including both physicians' and dentists' offices; 2) cardiac catheterization and angiographic procedures; 3) a vaginal or cesarean delivery or other invasive obstetric procedure during which bleeding may occur; or 4) the manipulation, cutting, or removal of any oral or perioral tissues, including tooth structure, during which bleeding occurs or the potential for bleeding exists."

Appendix reprinted from: Centers for Disease Control. Recommendation for prevention of HIV transmission in health-care settings. MMWR 1987;36 (suppl. no. 2S):6S-7S.

Telephone and HOTLINE Numbers

AIDS Information Line	**(800) 533-AIDS**
AIDS Prevention	**(314) 751-6438**
Communicable Disease consultation	**(314) 751-6113**
Communicable Disease reporting	**(800) 392-0272**
Community Sanitation	**(313) 751-6090**
Dioxin HOTLINE	**(800) 392-7245**
Division of Environmental Health and Epidemiology	**(314) 751-6080**
Environmental Epidemiology	**(314) 751-6102**
Immunization	**(314) 751-6133**
Occupational Health	**(314) 751-6102**
Office of Epidemiology	**(314) 751-6477**
Radiological Health	**(314) 751-6083**
Radon HOTLINE	**(800) 669-7236**
Sexually Transmitted Diseases	**(314) 751-6141**

EIS Officer Assigned to Missouri

Dr. Carol Friedman has joined the Department of Health , Office of Epidemiology, as an Epidemic Intelligence Service (EIS) Officer. She will be involved in investigation of acute disease outbreaks and other epidemiologic problems and will participate in surveillance and consultation regarding a variety of public health issues.

Dr. Friedman received her medical degree from the Texas College of Osteopathic Medicine in 1987. She completed an internal medicine residency and was Chief Resident in Internal Medicine at Central Texas Medical Foundation, Brackenridge Hospital in Austin, Texas before joining the EIS. During her residency years she had the opportunity to work in the sexually transmitted disease clinic for the Austin-Travis County Health Department. Before starting her medical studies, Dr. Friedman taught in junior high schools in Texas for 8 years.

The EIS program of the Centers for Disease Control provides epidemiology training to physicians and other professionals. Some of the officers are given a two-year assignment to state health departments to perform "shoe leather" epidemiology and others remain "in house" at the Centers in Atlanta, Fort Collins Colorado, Cinncinnati Ohio or Morgantown West Virginia.

Dr. Friedman is the seventh EIS officer assigned to Missouri since 1975. Four of the previous officers are now working with state or federal public health agencies, one is employed as an epidemiologist with a pharmaceutical company, and one is practicing internal medicine. We welcome Dr. Friedman to our newly developed Office of Epidemiology. She can be reached by phone at (314) 751-6477.

Readership Survey

Thanks to everyone who returned their readership survey form. It was gratifying to know that an overwhelming majority of surveys indicated that you read all or more than half of our newsletter. Outbreak summaries ranked as the preferred subject followed by revisions to program guidelines, environmental concerns and the bi-montly statistical report. We were also pleased that the majority of the surveys rated the content of our newsletter as good or excellent and that articles are generally considered to be appropriate in length.

We received numerous suggestions for topics some of which have already been provided in recent issues and others will be helpful in selecting topics for future issues

Your comments are appreciated. They will be most useful in planning future issues of the *Missouri Epidemiologist*. Your comments and questions are welcome any time.

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The *Missouri Epidemiologist* is a regularly scheduled bimonthly newsletter published by the Division of Environmental Health and Epidemiology of the Missouri Department of Health. The division's responsibilities include the prevention and control of communicable diseases and environmentally induced illnesses, including the requisite epidemiological investigations.

The Managing Editor is H. Denny Donnell, Jr., MD, MPH, State Epidemiologist, assisted by an Editorial Board including Bill Schmidt, MPH, Director, and Hilda Chaski, MPH, Deputy Director of the Division of Environmental Health and Epidemiology. Diane C. Rackers is the Production Manager. Questions or comments should be directed to (314) 751-6128 or toll free (800) 392-0272.

Missouri EPIDEMIOLOGIST

Volume XIII, Number 5 *September-October 1991*

Bureau of AIDS Prevention - 1990 Report

The Bureau of AIDS Prevention manages three broad strategies in its ongoing fight against AIDS: it alerts Missourians about how HIV spreads so they can evaluate their risk and avoid infection; it monitors the progression of the epidemic through a counseling and testing program and surveillance studies; and the Bureau gives assistance to those already infected through many home and health care services. This comprehensive approach to HIV management has proven beneficial to clients and cost-saving to Missouri.

During 1990, Bureau programs continued to inform people of their risk for HIV infection and how to prevent that infection. Health education/risk reduction, minority initiative and public information programs provided targeted prevention messages to Missourians through community meetings, school programs, public information campaigns and street and bar outreach.

Many prevention messages reach the local level through community-based organizations (CBOs). The CBOs reach people at risk for infection with messages that are culturally specific and sensitive to the needs of those at greater risk.

Prevention messages are also targeted at people seeking counseling and testing services. When people visit one of Missouri's 70 free counseling and testing sites they receive one-on-one prevention information about their risk of exposure to HIV and how to avoid further exposure. Over 38,000 people visited Missouri's free counseling and testing sites during 1990.

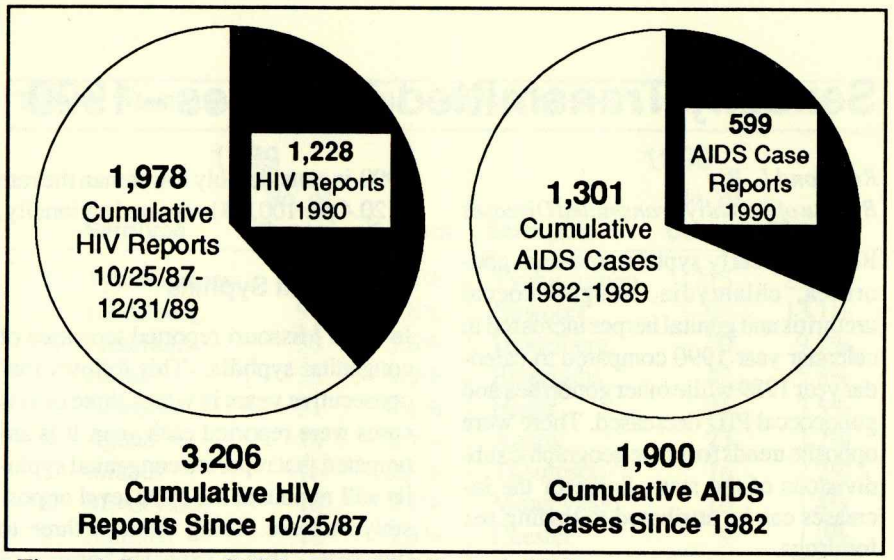

Figure 1. Reports of HIV and AIDS, Missouri, 1990

As of December 31, 1990, 1,228 new HIV infections were reported for the year. Many of these new infections were identified through counseling and testing sites and from private physicians. Physicians and others performing tests for HIV are required to report to the Department of Health the names of individuals testing positive for HIV and those diagnosed with AIDS. These reports are collected by the Bureau's surveillance program and evaluated to monitor the progression of the AIDS epidemic in Missouri.

The Bureau's surveillance and counseling and testing programs work closely to assure that HIV positives are recorded accurately and promptly. Figure 1 shows the 1990 HIV and AIDS reports in comparison to the cumulative cases since reporting began.

The most recent figures, as of October, 1991, show a cumulative 4,137 HIV reports in Missouri, and 2,429 cases of AIDS reported.

Inside this Issue...

The ever-increasing number of persons identified as HIV positive or having "full-blown" AIDS need many special health care, counseling and personal services. Most of these services can be accessed through the Bureau's care coordination and client services programs.

The Bureau received new federal dollars to help in its effort to care for individuals already infected with HIV. The Ryan White CARE Act of 1990 granted the Bureau $1 million to help expand several of its programs: medications, housing, health care, transportation and home and community based services. Ryan White dollars also paid for the initiation of a new insurance program to help cover the escalating cost of these services.

Many persons living with HIV and AIDS rely on the Bureau's programs to help them live longer, healthier and more independent lives.

As the Bureau plans its future strategies of prevention, education and care, and monitors the fight against AIDS, it will strive to stay current on the needs of those infected and generate new messages to prevent the further spread of this virus through Missouri.

For information about Bureau programs, HIV/AIDS statistics and questions related to HIV, the Bureau operates a toll-free AIDS Information Line—1-800-533-AIDS. Or, call the Bureau at (314) 751-6438.

Sexually Transmitted Diseases - 1990

Raymond L. Bly
Bureau of Sexually Transmitted Diseases

Reports of early syphilis, resistant gonorrhea, chlamydia, nongonococcal urethritis and genital herpes increased in calendar year 1990 compared to calendar year 1989 while other gonorrhea and gonococcal PID decreased. There were opposite trends for some geographic subdivisions of the state. Some of the increases can be attributed to trading sex for drugs.

Early Syphilis (Primary, Secondary and Early Latent under one year)

The reported incidence of early syphilis increased significantly in 1990 compared to 1989 with an increase of 177 cases or 67.8%. Primary and secondary cases increased 67.9% from 162 in 1989 to 272 in 1990. Early latent cases increased 67.7% from 99 in 1989 to 166 in 1990. Increases occurred in all areas of the state with Kansas City accounting for 43.1% of the total cases reported. The majority of the Kansas City and St. Louis cases continue to be reported in crack cocaine using areas where increases have also been noted in other sexually transmitted diseases.

Missouri's primary and secondary syphilis rate of 5.3 per 100,000 population in 1990 is considerably lower than the rate of 20.4 per 100,000 reported nationally.

Congenital Syphilis

In 1990 Missouri reported ten cases of congenital syphilis. This follows four consecutive years in which three or less cases were reported each year. It is anticipated that reported congenital syphilis will remain at the 1990 level or possibly increase during the next three to five years. This is expected because of the revised and expanded congenital syphilis surveillance case definition which was initiated by the Centers for Disease Control July 1, 1990, and the increasing incidence of early syphilis.

Gonorrhea

The reported incidence of gonorrhea decreased in Missouri from 21,053 cases in 1989 to 20,012 in 1990. This is a decrease of 1,041 cases or 4.9% and the rate decreased from 421.0 per 100,000 in 1989 to 391.1 per 100,000 in 1990. St. Louis City reported an increase of 475 cases, St. Louis County 192, Outstate Missouri 20 while Kansas City reported a decrease of 1,734 cases.

This is the first year in which a decrease in gonorrhea has been reported after two consecutive years of reported increases.

Penicillinase-producing *N. gonorrhoeae* (PPNG)

Resistant gonorrhea increased 73.4% from 407 cases reported in 1989 to 706 cases in 1990. Kansas City accounted for 317 of the 706 total cases, St. Louis City accounted for 231, St. Louis County 118, and Outstate Missouri accounted for 40 cases.

Gonococcal Pelvic Inflammatory Disease (GPID)

GPID decreased from 625 cases reported in 1989 to 396 cases in 1990. This decrease occurred in all areas of the state except for Outstate Missouri. St. Louis City and County reported a decrease from 409 cases in 1989 to 208 cases in 1990. Kansas City reported a decrease from 131 cases in 1989 to 17 in 1990. Outstate Missouri reported an increase from 85 cases in 1989 to 171 in 1990.

Nongonococcal Urethritis (NGU)

Reported cases of NGU increased from 6,690 in 1989 to 7,737 in 1990. This increase occurred in Kansas City and St. Louis City after two consecutive years of reported decreases. All other areas of the state reported decreases in 1990 compared to 1989.

Chlamydia trachomatis Infections

Chlamydia trachomatis infections increased 36.8% from 8,151 cases reported in 1989 to 11,151 reported in 1990. The reported incidence of *Chlamydia trachomatis* has increased each year since it was designated as a reportable condition in 1986. These increases are occurring because of increased testing and reporting. Based on the limited chlamydia testing which has been done during the last three years, chlamydia is believed to be much more prevalent than gonorrhea. Reported chlamydia is expected to continue increasing in public clinics and the private medical community as testing is expanded.

Genital Herpes

Genital Herpes increased 50% with 2,283 cases reported in 1989 compared to 3,310 cases in 1990. St. Louis City, St. Louis County and Kansas City reported increases in cases reported in 1990 compared to 1989. Outstate Missouri reported a decrease of 190 cases in 1990 compared to 1989.

Bureau of Communicable Disease Control 1990 Annual Report

Michael Fobbs
Bureau of Communicable Disease Control

The Bureau of Communicable Disease Control had an interesting year in 1990. The bureau started a new pilot outbreak reporting system in cooperation with the Centers for Disease Control (CDC) and has continued its participation in a three year study with the University of Missouri-Columbia Department of Entomology to determine the distribution of tick species and tickborne disease organisms in Missouri. Onsite assistance was provided by CDC in investigations of an outbreak of neonatal Group B streptococcal disease and a large hepatitis A restaurant outbreak.

Enterics

Campylobacter increased by 15.6% to 547 cases in 1990. Most of the increase was seen in the Central, Northwestern and Southeastern districts. Campylobacter was 79.9% above the five year median of 304 cases.

Salmonella was up only 7% to 723 cases despite a large outbreak of *S. newport* at a fall festival. *S. newport* was the second most common salmonella serotype reported for 1990 (See Table 1) but was the fifth most common serotype for 1989. Salmonella was 4.8% above the five year median of 690 cases.

Shigellosis at 284 cases was down 30.9% from 1989; areas of greatest reduction

Table 1. Most common salmonella serotypes, Missouri, 1989 and 1990

	1989			1990		
	Serotype	No. of Cases	Percent	Serotype	No. of Cases	Percent
1.	Typhimurium	179	26.5%	Typhimurium	215	29.7%
2.	Heidelberg	92	13.6%	Newport	95	13.1%
3.	Enteritidis	38	5.6%	Heidelberg	70	9.7%
4.	Hadar	33	4.9%	Enteritidis	42	5.8%
5.	Newport	31	4.6%	Hadar	25	3.5%
6.	Agona	18	2.7%	Agona	23	3.2%
7.	Infantis	16	2.4%	Thompson	16	2.2%
8.	Montevideo	16	2.4%	Montevideo	10	1.4%
9.	Bareilly	16	2.4%	Chester	9	1.2%
10.	Thompson	12	1.8%	Oranienburg	9	1.2%
11.	Braenderup	12	1.8%	Braenderup	8	1.1%
	All Others	213	31.3%	All Others	201	27.9%
	Totals	676		Totals	723	

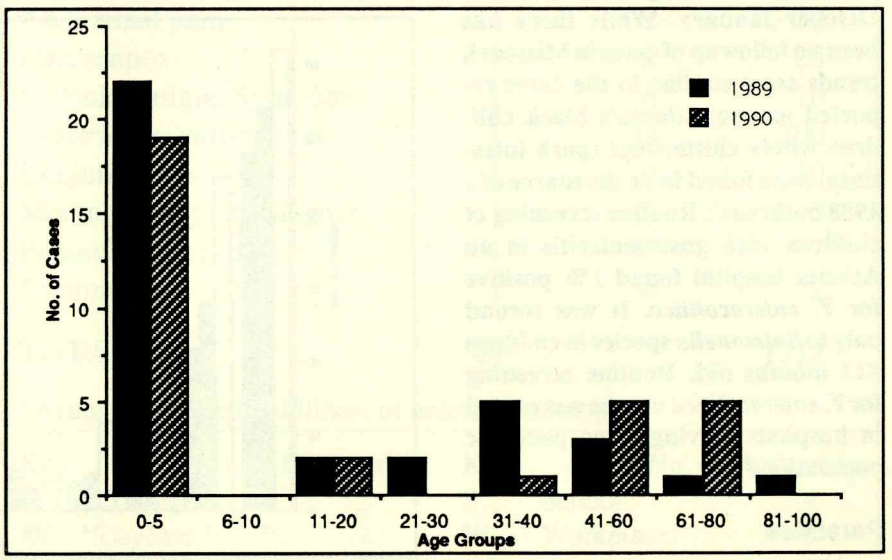

Figure 1. *Yersinia entercolitica* cases by age group, Missouri, 1989 and 1990

were in the Eastern and Northwestern districts. The five year median for Shigellosis was 411 cases.

Yersinia enterocolitica at 32 cases was down 11.1% from the previous year. The number of cases in the Eastern district fell by 40.7%. This decrease was offset in part by an increase from 3 to 6 cases in the Southwestern district. As in 1989, approximately 60% of the cases were in the 0-5 age group (See Figure 1 on page 3). Yersinia was up 220% above the five year median of 10 cases.

Yersinia enterocolitica is an emerging cause of pediatric gastroenteritis in the United States[1] and Missouri particularly in black families. The bacteria causes diarrhea, fever, vomiting and abdominal cramps. It has an incubation period estimated at 2-14 days with an estimated average of six days. Illness averages about a week with a range of 1 to 43 days[2]. Missouri has seen an average of 33 cases a year since 1988. One subspecies, *Y. enterocolitica* serotype O:3, is becoming common in the United States and pigs are a major reservoir for this serotype.

Blacks account for 42.8% (42 cases) of the 98 seen between 1988 and 1990; 23.5% (23 cases) are black children less than one year old. Among blacks, 76.1% are from the St. Louis area with onset occurring in the months of October-January. While there has been no followup of cases in Missouri, trends seem similar to the cases reported among Atlanta's black children where chitterlings (pork intestines) were found to be the source of a 1988 outbreak[3]. Routine screening of children with gastroenteritis in an Atlanta hospital found 1% positive for *Y. enterocolitica*. It was second only to *Salmonella* species in children ≤12 months old. Routine screening for *Y. enterocolitica* may be warranted in hospitals serving large pediatric populations[4].

Parasites

Giardia lamblia was up 2.2% overall with 878 cases reported. Increases of

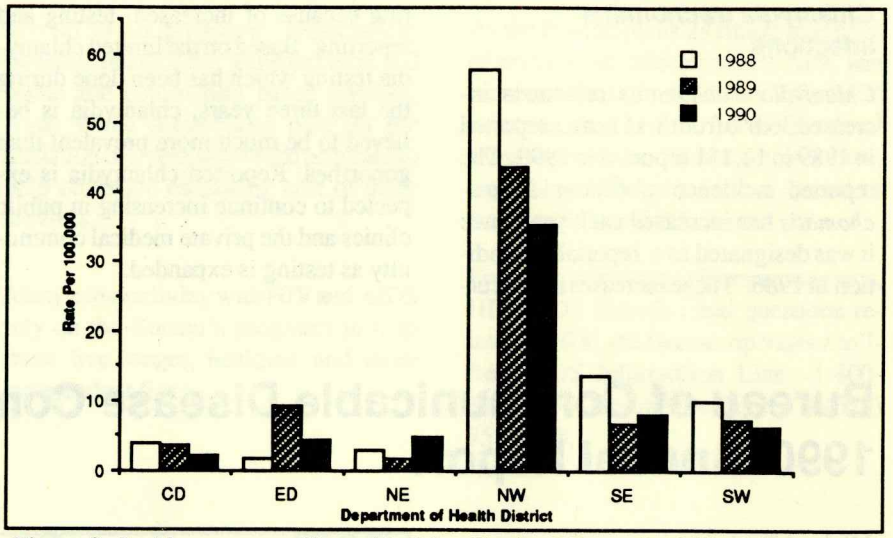

Figure 2. Incidence rates of hepatitis A by district, Missouri, 1988, 1989 and 1990

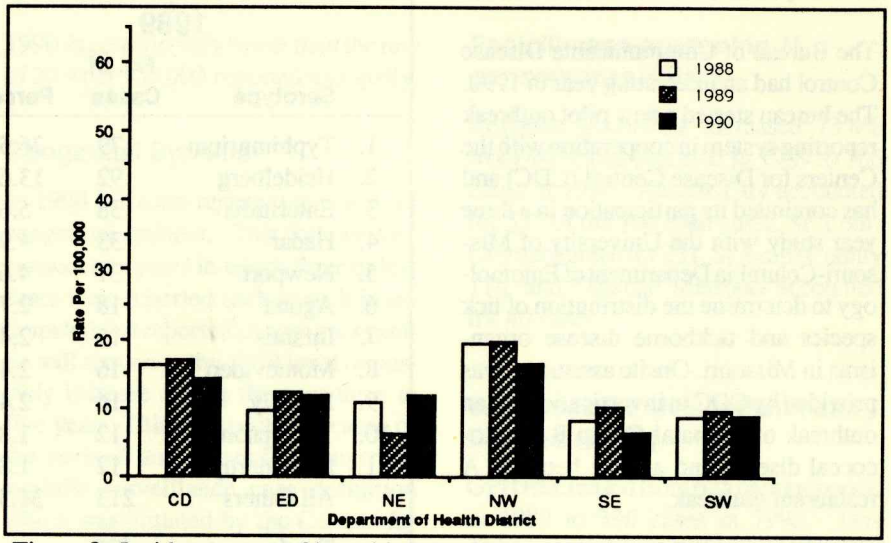

Figure 3. Incidence rates of hepatitis B by district, Missouri, 1988, 1989 and 1990

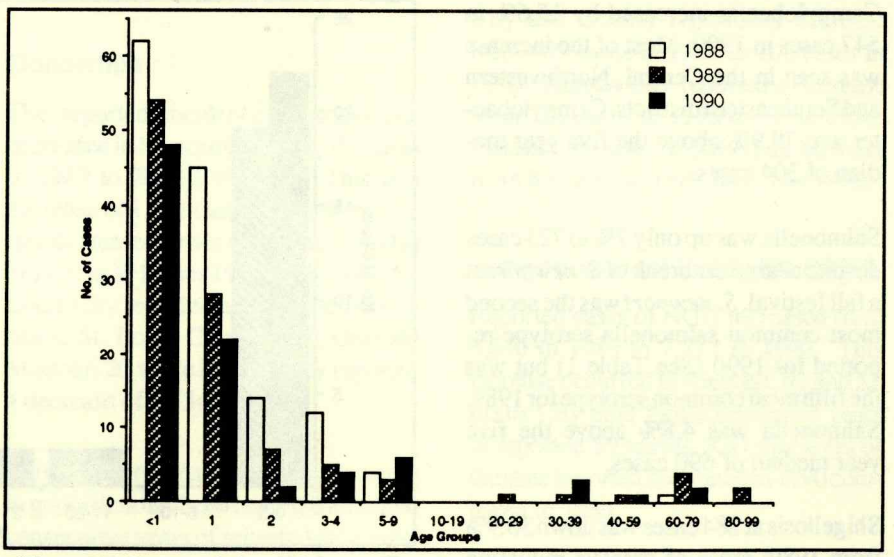

Figure 4. *Haemophilus influenzae* type b meningitis cases by age, Missouri, 1988, 1989 and 1990

100% and 34.7% were reported in the Southwestern and Northwestern districts. Giardia was up 34.2% over the five year median of 654 cases, perhaps reflecting increased surveillance in day care settings for the last few years.

Viral Hepatitis

Missouri reported 619 cases of hepatitis A, down 23.5% from 1989 despite a large outbreak in the Northwestern district at the end of 1990. Eastern and Northwestern districts led the way with decreases of 52.9% and 18.6% respectively. Northeastern and Southeastern districts reported the only increased rates (See Figure 2). The 1990 total was 10.5% above the five year median of 560 cases.

Hepatitis B was down 18.6% with 633 cases. It decreased in all districts but Northeastern, where the rate almost doubled (See Figure 3). It increased 37.6% above the five year median of 460 cases.

Meningitis

There were 246 cases of aseptic meningitis reported in 1990, up 10.3% from 1989. It was 43.0% above the five year median of 172 cases.

Thirty-one cases of meningococcal meningitis were reported in 1990, an increase of 47.6% from 1989. Meningococcal meningitis was down 11.4% from the five year median of 35.

Hib Disease

Hib meningitis continues to decline, down 17% from 106 cases in 1989. It was down 67.2% from the five year median of 131 cases. 1990 saw a decrease in cases in children two years old and under compared to 1989 and 1988 but a leveling off of the downward trend for 3-4 year olds (See Figure 4). Widespread immunization with the newer vaccines should continue to decrease the incidence of Hib disease.

There were 57 cases of other invasive Hib disease reported in 1990. Eastern district reported 24.6% and Northwest-

(continued on page 6)

1990 Communicable Disease and Nosocomial Outbreaks

Michael Fobbs
Bureau of Communicable Disease Control

During 1990, 45 communicable disease outbreaks were investigated in Missouri communities, involving 1,712 cases, an increase of 60.7% from 28 outbreaks in1989. Concurrently, there were 49 nosocomial outbreaks encompassing 626 cases, an increase of 25.6% from 39 outbreaks in 1989. Better surveillance at the local and district levels and par-

Table 1. Communicable disease outbreaks, Missouri 1990

Cause	No. of Outbreaks	Setting	No. of Cases
AGI*			
Unknown vehicle	6	W,2CA,O,L,R	162
Foodborne	5	4R,O	105
Waterborne	2	C,L	161
AGI Totals	**13**	-	**428**
Giardia	9	8DC,C	53
Hepatitis A	6	5C,R	168
Salmonella			
Serotype unknown	1	C	2
S. kiambu	1	R	4
S. newport	2	O,C	120
S. typhimurium (lysine negative)	1	C	34
Salmonella Totals	**5**	-	**160**
Shigella sonnei	2	DC,O	34
Staph intoxication	2	R,S	53
Abdominal pain	1	C	10
Chickenpox	1	S	25
Chronic Fatigue Syndrome	1	W	10
Clostridium perfringens	1	O	700
Conjunctivitis	1	S	30
Meningococcal meningitis	1	S	2
Parainfluenza type 3	1	C	37
Pneumonia	1	W	2
TOTALS	**45**		**1712**

*Acute gastrointestinal illness of unknown etiology

Key	No. of Outbreaks		Key	No. of Outbreaks	
C	Community	12	S	School	4
DC	Daycare	9	W	Workplace	3
R	Restaurant	8	CA	Camp	2
O	Other	5	L	Lodging Facility	2

ticipation in the pilot outbreak reporting project may explain much of this increase in reported outbreaks.

The communicable disease outbreaks are shown in Table 1 on page 5 by cause, setting and number of cases. Each of the reported outbreaks was investigated by the Department of Health (DOH) and/or the local health department. The most common causative agent was *Giardia lamblia* (nine outbreaks), followed by hepatitis A (six outbreaks) and salmonella (five outbreaks). A total of 13 outbreaks were classified as "acute gastrointestinal illness of unknown etiology" including five in which food was the likely vehicle and two where water was the likely vehicle. The largest single outbreak (700 cases in one institution) was caused by *Clostridium perfringens*.

Nine outbreaks took place in day care settings, eight of them caused by *Giardia lamblia*. Restaurants were implicated in eight outbreaks. The largest of these (130 cases) was caused by hepatitis A and was investigated with the assistance of a team from CDC. Four outbreaks occurred in schools, three in places of work, and two each in camps and lodging facilities. In 12 outbreaks, exposures occurred in particular communities but could not be linked to any establishment.

The 1990 nosocomial outbreaks and investigations are shown in Table 2. Forty of the 49 reported outbreaks or investigations occurred in nursing homes. Seven were reported in hospitals and two in other extended care facilities.

Scabies outbreaks were the most commonly reported, with 22 nursing home outbreaks. Eleven outbreaks of methicillin-resistant *Staphylococcus aureus* (MRSA) were reported from hospitals and nursing homes. An extensive epidemiologic investigation was performed by DOH, CDC and the local health department to assist the institution affected by the outbreak of neonatal Group B strep infections. Consultation and technical assistance was provided by DOH in 16 of the other outbreaks.

Table 2. Nosocomial outbreaks and investigations, Missouri, 1990

Cause	No. of Outbreaks	Setting	No. of Cases
Scabies	22	NH	326
MRSA*	11	7NH,4H	114
Influenza-like illness	3	NH	54
Clostridium difficile	2	H,O	13
Staph. aureus	2	NH	20
Hepatitis A	1	NH	1
Meningococcal meningitis	1	NH	1
Neonatal Group B strep	1	H	24
Pediculosis	1	H	20
Pertussis	1	O	1
Salmonella enteritidis	1	NH	1
AGI**			
Unknown vehicle	1	NH	25
Foodborne	1	NH	9
URI***	1	NH	17
TOTALS	**49**		**626**

* Methicillin resistant *Staph aureus*
** Acute gastrointestinal illness of unknown etiology
*** Upper respiratory infection

Key		No. of Outbreaks
NH	Nursing Home	40
H	Hospital	7
O	Other Extended Care Facility	2

Communicable Disease Control 1990 Annual Report

(continued from page 5)

ern district reported 52.6% of the cases. Northeastern had 1.8% of the cases. The remaining 21.0% was distributed almost evenly between the Central, Southeastern and Southwestern districts.

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Missouri Department of Health
Disease Prevention - Communicable Disease Control

BIMONTHLY MORBIDITY REPORT

Reporting Period *
July - August, 1991

	Districts							KANSAS CITY	ST. LOUIS CITY	ST. LOUIS CO.	SPGFLD GREENE CO.	2 MONTH STATE TOTALS		CUMULATIVE		
	** NW	NE	CD	SE	** SW	** ED	*** OTHER					1991	1990	FOR 1991	FOR 1990	5 YR MEDIAN
Vaccine Preventable Dis.																
Chickenpox	23	7	14	22	36	28	0	0	0	2	0	132	237	6344	9035	6852
Diphtheria	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Hib Meningitis	0	1	0	1	0	0	0	1	0	0	0	3	8	25	65	78
Hib Other Invasive	2	0	2	0	2	0	0	0	0	0	0	6	15	35	35	**
Influenza	0	0	0	0	0	0	0	0	0	0	0	0	0	129	216	93
Measles	0	0	1	0	0	0	0	0	0	0	0	1	16	1	96	96
Mumps	0	0	0	1	1	1	0	0	1	0	0	4	7	28	51	30
Pertussis	0	0	0	4	3	3	0	6	0	1	0	17	36	42	67	24
Polio	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Rubella	0	0	0	0	0	0	0	0	0	0	1	1	0	5	0	0
Tetanus	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1
Viral Hepatitis																
A	4	2	18	23	3	5	0	31	11	9	1	107	63	458	343	343
B	9	6	7	5	2	9	0	17	8	8	9	80	91	309	394	394
Non A - Non B	4	2	3	4	3	3	0	20	3	2	7	51	19	194	43	30
Unspecified	1	0	0	0	1	1	0	1	0	0	0	4	7	8	20	14
Meningitis																
Aseptic	10	7	15	8	7	13	0	4	1	27	14	106	74	188	131	83
Meningococcal	0	1	0	0	0	0	0	0	1	0	0	2	4	29	23	23
Other	2	2	2	3	1	0	0	0	1	0	1	12	13	48	51	48
Enteric Infections																
Campylobacter	13	4	10	12	11	19	0	12	7	27	11	126	165	387	377	276
Salmonella	21	2	24	13	13	13	0	15	11	32	6	150	145	357	407	460
Shigella	9	1	10	2	4	0	0	40	4	5	1	76	60	146	155	210
Typhoid Fever	0	0	0	0	0	1	0	0	0	1	0	2	3	2	3	3
Parasitic Infections																
Amebiasis	0	0	0	0	0	1	0	0	0	1	1	3	3	15	11	11
Giardiasis	20	13	22	15	12	36	0	26	8	32	8	192	165	437	447	379
Sexually Transmitted Dis.																
AIDS	9	2	8	5	3	5	4	28	42	23	0	129	68	396	334	245
Gonorrhea	84	2	78	110	38	19	0	868	1462	591	41	3293	3230	11848	13323	10947
Genital Herpes	39	6	30	33	20	36	0	140	74	160	29	567	515	2319	2191	1429
Nongonoc. urethritis	14	3	27	24	1	1	0	386	817	523	0	1796	1582	5664	5154	4973
Prim. & Sec. syphilis	2	0	3	1	3	0	0	58	26	7	0	100	51	340	158	83
Tuberculosis																
Extrapulmonary	0	0	1	0	1	1	0	0	2	0	0	5	7	28	25	31
Pulmonary	1	0	3	8	4	2	1	0	1	8	1	29	69	119	185	169
Zoonotic																
Animal Bites	220	50	55	147	92	115	0	0	1	0	18	698	929	2625	3878	2847
Psittacosis	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1
Rabies (Animal)	1	0	1	1	1	0	0	1	0	3	1	9	5	16	20	41
Rocky Mtn. Sp. Fever	0	1	0	4	2	1	0	1	0	0	0	9	15	17	27	27
Tularemia	0	1	0	5	1	1	0	0	0	0	2	10	8	30	21	28

Low Frequency Diseases

Anthrax
Botulism
Brucellosis
Chancroid - 5
Cholera
Cryptosporidiosis
Encephalitis (infectious) - 5
Encephalitis (viral/arbo-viral) - 1
Granuloma Inguinale
Kawasaki Disease
Legionellosis - 2
Leptospirosis
Lymphogranuloma Venereum - 1
Malaria - 1
Plague
Rabies (human)
Reye's Syndrome
Rheumatic fever, acute
Toxic Shock Syndrome - 1
Trichinosis

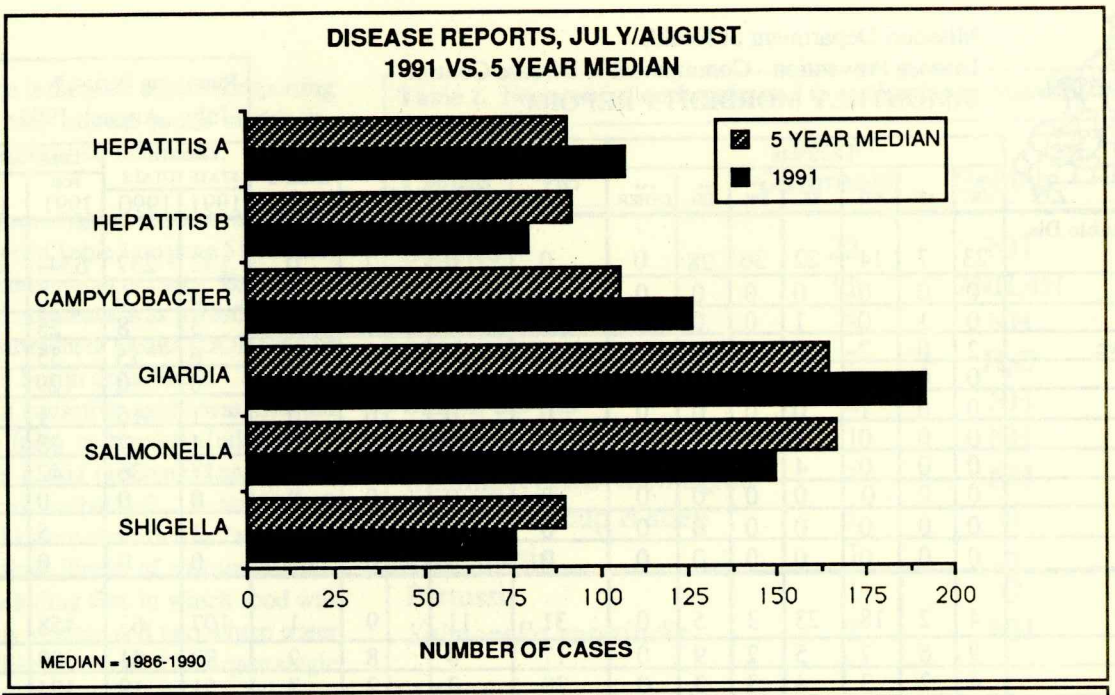
Outbreaks

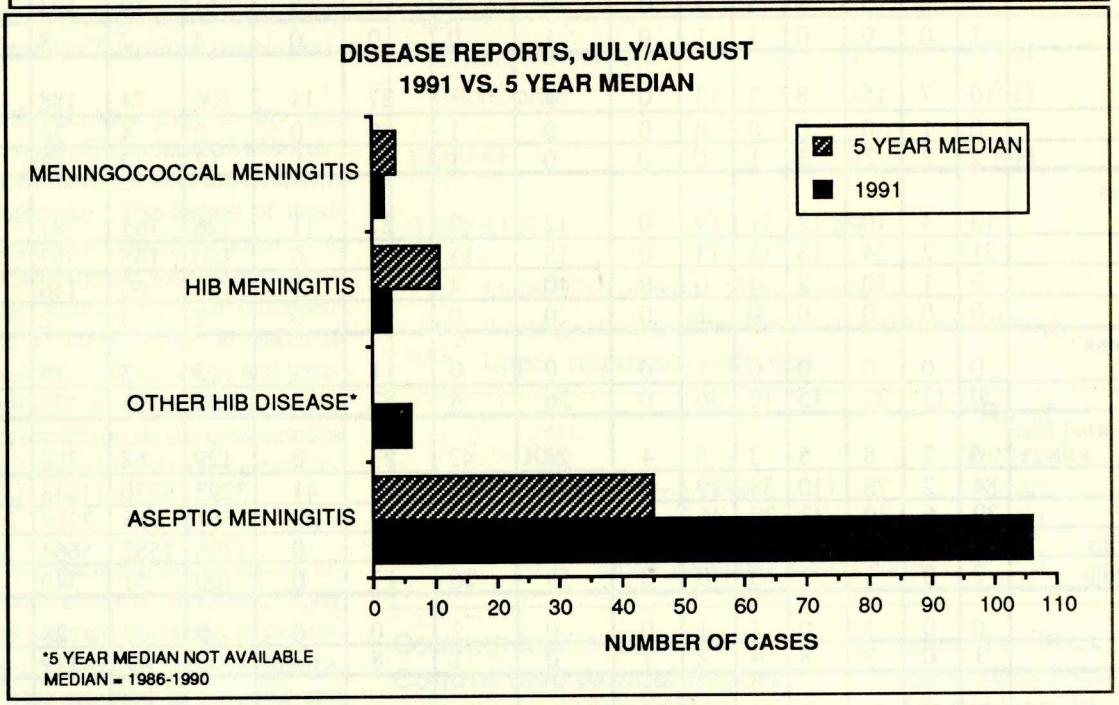
Foodborne - 3
Waterborne
Nosocomial - 3
Pediculosis
Scabies - 2
Other
- Giardia - 1
- Hepatitis A - 1
- Shigella - 1

*Reporting Period Beginning July 1, Ending August 31, 1991.
**Totals do not include KC, SLC, SLCo, or Springfield
***State and Federal Institutions
** Data not available

Due to data editing, totals may change.

TEAR OUT FOR FUTURE REFERENCE





ENTERICS

Campylobacter was reported at 126 cases for 1991, 18.9% above the five year median of 106 cases, but down 31.0% from the 165 cases reported in 1990. Salmonella was reported at 150 cases for 1991, down 10.2% from the five year median of 167 cases, but up 3.4% from last year's 145 cases. Shigella, at 76 cases for 1991, is down 15.6% from the five year median of 90 cases and up 26.7% from the 60 cases reported last year for the bimonthly period.

MENINGITIS

Aseptic meningitis affected 106 people during July/August. This was a rise of 256% from the five year median of 45 cases and a rise of 34.0% from the 74 cases reported during the 1990 bimonthly period. Meningococcal meningitis, at 2 cases for the 1991 bimonthly period, is down 50% from 4 cases in 1990 which was also the five year median.

HIB DISEASE

Hib meningitis continues to drop. There were 3 cases in July/August 1991, which is down 62.5% from 8 cases in 1990 and down 72.7% from the five year median of 11 cases. Other invasive Hib disease decreased 60% from 15 cases in 1990 to 6 cases during July/August 1991. There is no five year bimonthly median for other Hib disease.

VIRAL HEPATITIS

Hepatitis A at 107 cases is 17.6% above the five year bimonthly median of 91 cases and up 69.8% from the 63 cases reported during the 1990 July/August bimonthly period. There were 80 cases of Hepatitis B during the July/August 1991 period, down 13.0% from the five year median of 92 cases and down 12.0% from the 91 cases reported in 1990 during that period.

PARASITES

Giardia, at 192 cases, is up 16.4% from the 165 cases reported for the 1990 time period, which was also the five year median.

Index to *Missouri Epidemiologist*

January 1990 to August 1991

KEY

AR90 = Annual Report--June 1990
J/A90 = July/August 1990
J/A91 = July/August 1991
J/F90 = January/February 1990
J/F91 = January/February 1991
June90 = June 1990
M/A90 = March/April/May 1990
M/A91 = March/April 1991
M/J91 = May/June 1991
N/D90 = November /December 1990
S/O90 = September/October 1990

State Public Health Laboratory Report

Newborn Screening — Hypothyroidism, Phenylketonuria,Galactosemia and Hemoglobinopathies

James Baumgartner, BS, MBA, Chief, Metabolic Disease Unit

	Jul 91	Aug 91	Total YTD
Specimens Tested	11,091	10,378	78,306
Initial (percent)	70.4%	67.9%	54,657
Repeat (percent)	29.6%	32.1%	23,649
Specimens: Unsatisfactory	125	109	990
HT Borderline	365	338	2,497
HT Presumptive	14	15	70
PKU Borderline	31	16	134
PKU Presumptive Positive	1	0	5
GAL Borderline	136	50	770
GAL Presumptive Positive	3	5	34
FAS (Sickle cell trait)	117	108	850
FAC (Hb C trait)	30	27	211
FAX (Hb variant)	17	15	124
FS (Sickle cell disease)	3	1	15
FSC (Sickle C disease)	0	1	9
FC (Hb C disease)	0	0	4

HT = Hypothyroidism, PKU = Phenylketonuria, GAL = Galactosemia, Hb = Hemoglobin, YTD = Year to Date

Vaccine-Preventable Diseases - 1990

Lisa Speissegger
Marilyn Kemna
Bureau of Immunization

During 1990, the number of reported cases of vaccine-preventable diseases decreased substantially from the high levels of 1989. The combined approach of active surveillance, rapid laboratory testing, and use of disease intervention methods was the key factor in decreasing the incidence of vaccine-preventable diseases in 1990.

Measles

The most significant decrease in cases occurred in measles. In 1989, 671 cases of measles were identified in Missouri. In 1990, 103 cases of measles were identified--less than one-sixth the number of cases in 1989.

However, the age groups that were affected in 1990 were a cause for concern. The most significant outbreak in 1990 consisted of unimmunized preschool-age children (ages 1-4). A majority of these children were old enough to have been immunized against measles.

In order to combat further measles outbreaks, an emphasis has been placed on increasing the number of children who are adequately protected against this disease. A second dose of measles vaccine is required for kindergarten and first grade students in the 1991-92 school year. Implementation of the child care immunization law has been expanded to include an immunization record audit of 50% of the child care centers in the state to insure the health and safety of those attending these facilities.

Pertussis

The incidence of pertussis dropped slightly during 1990 to 116 cases. The urban areas of Kansas City and St. Louis reported 32% of the cases. A source could not be identified for the majority of the cases.

One epidemiologically-linked outbreak occurred in northeast Missouri. Eight cases were reported related to a large outbreak in Illinois. Several of the cases reported were adults, similar to the Illinois outbreak.

Of all the cases reported, seventy-one (61.2%) occurred in unimmunized or underimmunized children under 2 years of age. Both the Immunization Practices Advisory Committee (ACIP) and the American Academy of Pediatrics (AAP) recommend the continued use of whole-cell pertussis vaccine in infants and children. Recent studies have indicated the vaccine is safe and effective. Pertussis immunization is required for attendance in child care facilities.

Mumps

There was a slight decrease in the number of mumps cases reported in 1990. Sixty-two cases were reported, a 29% decrease from 1989. The group primarily affected was school-age children.

Mumps vaccination is not required for school attendance in Missouri; however, the vaccine of choice for measles and rubella immunization (which are required immunizations for attendance) is MMR, which contains the mumps antigen.

Haemophilus influenzae type b

In 1990, 145 cases of *Haemophilus influenzae* type b (Hib) invasive disease were identified. The increase from the 1989 level of 106 cases is due to a change in the case definition to include disease other than meningitis.

In October and December, 1990, the Food and Drug Administration approved the use of two *Haemophilus* type b conjugate vaccines (HbCV) for infants, starting at two months of age. Because Hib is primarily seen in children under the age of 2, full implementation of the vaccine series by both the public and private sectors should have a profound effect on the incidence of this disease.

Rubella

Three cases of rubella were reported to the Bureau of Immunization during 1990. Two of these cases involved unimmunized young children (11 and 13 months of age) from the same county; however, no epidemiological link could be found between these cases. The third case involved a previously immunized 11 year old child in another section of the state. Since measles has again become a concern, rash illnesses such as rubella that usually have mild symptoms may be more likely to be evaluated by a health professional and, therefore, reported to the Department of Health.

The low incidence of vaccine-preventable diseases in Missouri can be attributed to the efforts of both the public and private health care sectors. The changes in measles vaccine administration and *Haemophilus influenzae* type b conjugate vaccines will help reduce the incidence of these two diseases. With support by public and private schools and child care facilities, Missouri's children will be better protected from these preventable diseases at an earlier age. ■

1990 Rabies Summary

(continued from page 14)

The Missouri Department of Health now has a model rabies and animal control document that all individual counties have the authority to implement. Counties are encouraged to utilize this basic document to meet their requirements. The document is comprehensive and covers all aspects of animal control, including observation periods, proper vaccination of dogs and cats, general animal control, and dangerous animal control. Counties were sent copies of this document in the fall of 1990. Additional copies and assistance in implementing this model ordinance are available by contacting the Bureau of Veterinary Public Health at 314-751-6136.

Tuberculosis in 1990: Increasing Concern for Minorities, Elderly and Younger Missourians

Vic Tomlinson
Bureau of Tuberculosis Control

In 1990, 312 cases of tuberculosis were reported in Missouri for a case rate of 6.1 per 100,000 population. This represents a substantial increase of 34 cases (12.2%) over the previous year. This increase was primarily due to the major outbreak of tuberculosis that occurred in an elementary school in St. Louis County during May, 1990. As a result of that outbreak, 51.3% (176/343) of the students in the elementary school and 26.5% (13/49) of the staff were infected. Also, thirty-two of these students developed tuberculous disease. For details see the July-August 1991 issue of *Missouri Epidemiologist.*

The incidence of tuberculosis increased by 52.4% in St. Louis County; the increase in St. Louis City was 35.3%. While these metropolitan areas experienced large increases, Kansas City experienced a slight decrease of 2.6%. Although the increase in the number of outstate cases is small, this area experienced a major portion (52.6%) of the total cases.

Overall 62.2% of the cases in Missouri occurred among whites, 34.3% among blacks and 3.2% among Asians. This represents a large increase statewide in the percentage of cases occurring among blacks from 25.9% in 1989 to 34.3% in 1990. However, the percentages were even higher in the major metropolitan areas. Specifically, in St. Louis City, 71.7% of the cases occurred among blacks. This represents an increase from 64.7% in 1989. In St. Louis County, the percentage of cases occurring among blacks increased from 21.4% in 1989 to 46.9% in 1990. Also, in Kansas City, the percentage of cases occurring among blacks increased from 38.5% in 1989 to 55.3% in 1990. If case rates are considered, the rate of disease among minorities statewide was 19.8 per 100,000 population. Specifically, the rate among blacks was 19.5 and the rate among Asians was 24.2. In comparison, the case rate among whites was 4.3. Therefore, members of the state's minority populations are at least four times as likely as whites to develop tuberculosis.

The percentage of tuberculosis cases occurring among the elderly (i.e. age 65 or older) is once again increasing. During 1989, 120 cases (43.2%) occurred among individuals age 65 or older. In 1990, 141 out of 312 cases, or 45.2 percent, occurred among the elderly. Also, an increasing number of cases are occurring in the 25-44 age group. In 1989, a total of 75 such cases (27%) occurred in this age group as opposed to 79 cases (25.3%) that occurred during 1990. Although the percentage of these cases is slightly less in 1990, it is still significant that 25.3% occurred in individuals in this younger age group. In addition, as a result of the outbreak that occurred in St. Louis County, more cases were observed in those under age 15. During 1989, only nine of the 278 cases (3.2%) occurred in this age group. However, in 1990, 37 of the 312 cases (11.9%) were reported in children under 15 years of age.

During 1990, 15 foreign-born individuals (4.8%) were reported with tuberculosis in Missouri. Of this number, 66.7% were from Asian countries and 13.3% were from one African country.

A decrease was observed in the number of cases that occurred in correctional facilities. During 1989, 21 cases (7.6%) were reported from state and federal correctional centers. In 1990, the number of such cases decreased to 11 (3.5%). Screening efforts intensified in some high risk groups during 1990. Mass tuberculin testing was implemented at the Jefferson City Correctional Center. Fourteen cases of tuberculosis had occurred there since 1986 and 57% (8/14) of the cases were determined to be resistant to at least one anti-tuberculosis medication. The results of the screening showed that 21.3% (397/1864) of the inmates were infected, 9.3% (67/712) of the staff were infected and four cases of tuberculous disease were detected among the inmates. Chest x-rays, physician evaluation services and treatment were provided as part of the follow-up services.

The association between AIDS and tuberculosis is a growing concern. Of the 1,900 cases of AIDS reported among Missouri residents through 1990, a total of 40 individuals have been reported with a diagnosis of tuberculosis as well. In addition, there have been a total of 61 cases of mycobacterial disease other than tuberculosis (MOTT) reported among AIDS patients. The most common mycobacteria isolated from these individuals is the *M. avium* complex, which was isolated from a total of 48 patients (78.7%).

Missouri was the first state in the nation to develop and adopt a strategic plan for the elimination of tuberculosis by the year 2010. In 1989, the Missouri Advisory Committee for the Elimination of Tuberculosis developed this plan. This committee, consisting of representatives from the Missouri Department of Health, the Department of Corrections, the American Lung Associations of Missouri, local health departments and other health care professionals, met several times during 1990 to review progress in tuberculosis control. Our goal is to have no more than five cases of tuberculosis by the year 2010, with an interim goal of no more than 175 cases by the year 2000.

1990 Rabies Summary

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Bureau of Veterinary Public Health

Missouri experienced a total of 30 cases of animal rabies in 1990. This was the lowest number of rabies cases recorded in a single year since records have been maintained. The only other years when the number of cases dropped below 50 per year were 1974 and 1988, with 41 and 36 respectively. The distribution of the disease throughout the state confirms that rabies was endemic in the entire state of Missouri (See Figure 1). In the decade of the eighties, rabies occurred in 93 of 115 Missouri counties (See Figure 2). Since the 22 counties that showed an absence of rabies conducted a very limited passive surveillance for rabies, the true nature of rabies in these counties cannot be determined. As in past years, most of the 1990 cases were located in central Missouri. Rabies activity continued in the northeast part of the state in Schuyler and Scotland counties. Bat rabies also continued in the St. Louis area, although at a lower level. The species distribution for 1990 is shown in Figure 3 and the species distribution for the decade is shown in Table 1.

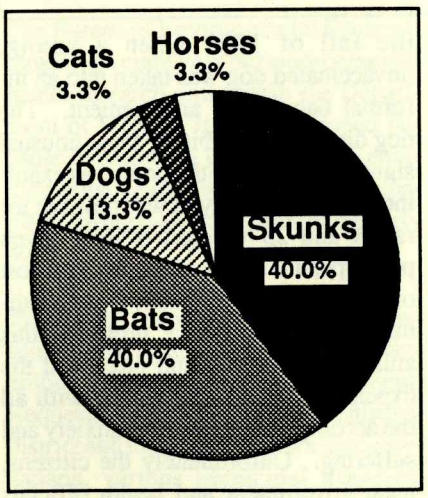

Figure 3. Animal rabies by species, Missouri, 1981-90

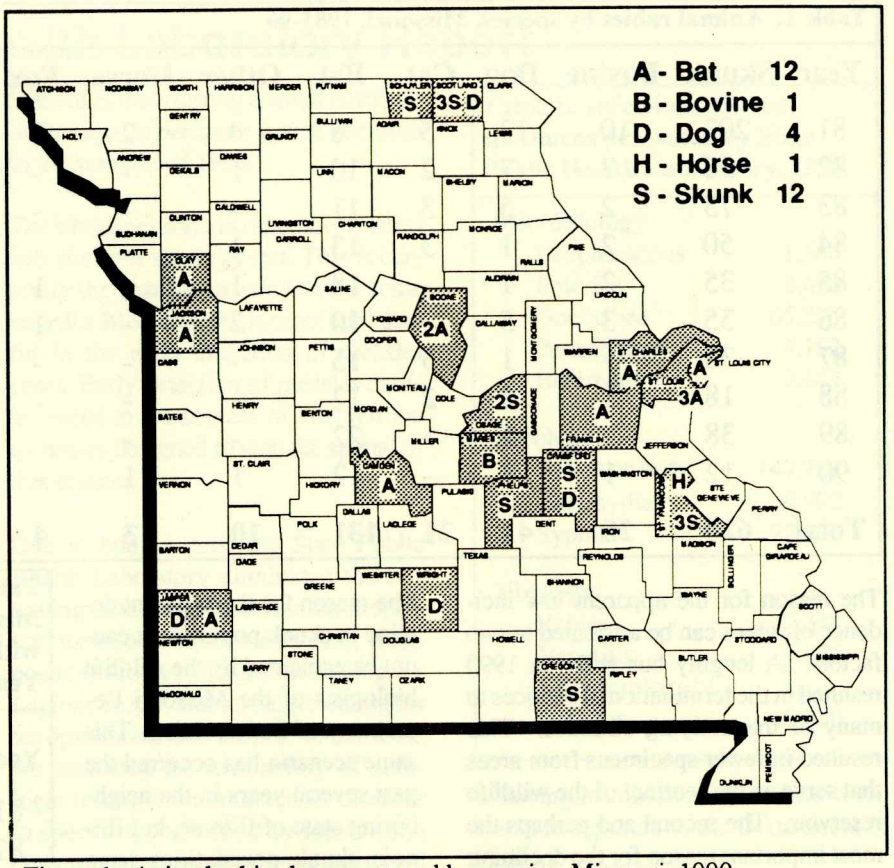

Figure 1. Animal rabies by county and by species, Missouri, 1990

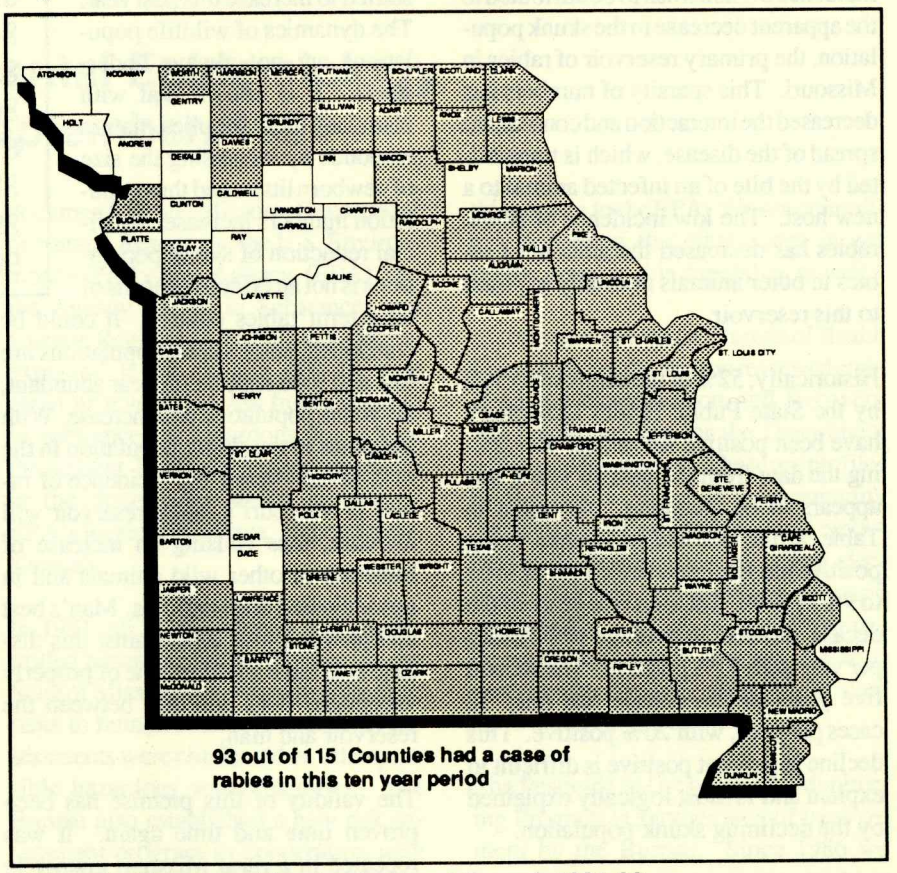

Figure 2. Counties with animal rabies, Missouri, 1981-90

Table 1. Animal rabies by species, Missouri, 1981-90

Year	Skunk	Bovine	Dog	Cat	Bat	Other	Horse	Fox	Goat	Opossum	Coyote	Total
81	203	10	13	5	8	4	2	2	-	-	-	243
82	96	7	7	2	10	1	-	-	1	-	-	123
83	75	2	5	3	11	-	-	-	-	-	-	96
84	50	2	1	3	13	1	-	-	-	-	1	70
85	35	2	1	-	18	1	-	1	-	-	-	57
86	55	3	5	-	10	2	-	1	-	1	-	75
87	38	-	1	5	15	-	-	-	-	-	-	59
88	18	1	3	2	12	-	-	-	-	-	-	36
89	38	-	1	1	22	-	-	-	-	-	-	62
90	12	1	4	-	12	1	1	-	-	-	-	30
Total	**620**	**28**	**41**	**21**	**131**	**10**	**3**	**4**	**1**	**1**	**1**	**851**

The reason for the apparent low incidence of rabies can be attributed to two factors. A lengthy bus strike in 1990 resulted in the termination of services to many of the outlying counties. This resulted in fewer specimens from areas that serve as the sentinel of the wildlife reservoir. The second and perhaps the most important reason for the declining incidence of rabies has to be attributed to the apparent decrease in the skunk population, the primary reservoir of rabies in Missouri. This sparsity of numbers has decreased the interaction and consequent spread of the disease, which is transmitted by the bite of an infected animal to a new host. The low incidence of skunk rabies has decreased the amount of rabies in other animals normally exposed to this reservoir.

Historically, 52% of the skunks checked by the State Public Health Laboratory have been positive for rabies. Reviewing the data from the past 10 years, this appears to be changing. As noted in Table 2, the percent of skunks being positive has declined from 58% in 1981 to 9% in 1990. The first five years of the decade showed an average of 92 cases per year with 41% positive. The second five years of the decade had only 32 cases per year, with 20% positive. This decline in percent positive is difficult to explain and is most logically explained by the declining skunk population.

The reason for the apparent decline in skunk populations cannot be explained by the wildlife biologists of the Missouri Department of Conservation. This same scenario has occurred the past several years in the neighboring state of Illinois, but Illinois skunk populations have started to increase this past year. The dynamics of wildlife populations are not always understood. It is known that with abundant food supplies, nature responds by increasing the size of newborn litters and thus population numbers increase. Artificial reduction of skunk populations is not an effective means of long term rabies control. It could be concluded, since skunk populations are low and food supplies appear abundant, the skunk population will increase. With increases in the skunk population in the next several years, the incidence of rabies in Missouri's rabies reservoir will increase, thus causing an increase of infection in other wild animals and in unvaccinated dogs and cats. Man's best and proven protection against this disease is to have a buffer zone of properly vaccinated dogs and cats between the reservoir and man.

The validity of this premise has been proven time and time again. It was repeated in a rural Missouri county in the fall of 1990 when a young, unvaccinated dog was taken into an informal babysitting arrangement. The dog died after exhibiting some unusual signs. Fortunately, the brain was examined. Unfortunately, it was positive for rabies and 23 youngsters were given postexposure rabies treatment at a cost of approximately $23,000. An expenditure of $5 could have protected this animal from rabies and precluded the expenditure of $23,000 along with all the accompanying hysteria, anxiety and suffering. Unfortunately the citizens, local government and health officials have still not acted to prevent this episode from reoccurring.

(continued on page 11)

Table 2. Skunk Specimens Submitted to Missouri State Public Health Laboratory with Number and Percent Positve by Year, 1981-90

Year	No. of Positives	Total Submitted	Percent Positive
81	202	346	58%
82	97	216	45%
83	75	231	32%
84	50	122	41%
85	35	124	28%
86	55	194	28%
87	38	213	18%
88	18	110	16%
89	38	165	23%
90	12	132	9%

1990 State Public Health Laboratory Report

Eric C. Blank, DrPH
State Public Health Laboratory

The State Public Health Laboratory received and processed over 130,000 specimens related to the diagnosis of infectious diseases, other than AIDS, in calendar year 1990. There were two notable events in which the laboratory played a very important role.

First, the causative agent of the disease outbreak which occurred in Cabool, Missouri, January-February 1990, was identified by the laboratory in the first isolates that were referred from symptomatic patients. Early identification of that agent, *E. coli* 0157:H7, enabled local, state and federal public health officials to implement appropriate intervention and treatment strategies and allowed them to concentrate on finding the source of the outbreak.

Secondly, the laboratory provided technical consultation and assistance to the State of Illinois during a small outbreak of *Bordetella pertussis* which occurred in the summer of 1990.

The laboratory added a rubeola (measles) specific IgM serology test. This is currently the best diagnostic test for acute measles infections and is especially useful in the early detection of measles cases. Early detection of measles cases is crucial to the success of intervention measures designed to stop the spread of this disease.

Due to budget cuts, the State Public Health Laboratory eliminated the following testing services: routine streptococcus testing (throat cultures), diagnostic mycology, diagnostic testing for *Legionella spp.* and serologic testing for toxoplasmosis and herpes. In addition, we restricted the availability of serologic testing for immunizable diseases to specimens submitted by local health departments or from patients suspected of having an immunizable disease which has been reported to the Department of Health.

Table 1. Infectious disease specimens processed by State Public Health Laboratory, 1990

Microbiology	
Streptococcus	1,560
Enterics	2,690
Gonorrhea	65,215
Parasitology	4,162
Reference	2,447
Serology	
HIV Antibody	147,769
Chlamydia	30,902
Syphilis	22,377
Virology	
Rabies	2,348
Hepatitis	7,476
Viral serology/ isolation	9,850

Bureau of Environmental Epidemiology 1991 Report as of September, 1991

Gale M. Carlson, BS
Bureau of Environmental Epidemiology

The Bureau of Environmental Epidemiology is an eight year old environmental health research unit within the Department of Health. It was developed because of a need by the state for an environmental health risk assessment capability during the dioxin crisis of the early 80's.

The bureau is routinely involved in assessing risk to human health from hazardous substances in the environment. Requests come from private citizens, district and local health authorities, physicians, various municipal agencies, other state agencies and various federal organizations. Requests vary from simple questions such as, "will this chemical harm me?" to complex grants and contracts. We produce a variety of documents for the Missouri Department of Natural Resources, the U.S. Environmental Protection Agency (EPA) and the Agency for Toxic Substances and Disease Registry (ATSDR) that discuss exposure levels, health effects, safe clean-up levels, and risk from exposure to substances at hazardous waste sites throughout Missouri and occasionally in the three other states comprising EPA's Region VII (Iowa, Nebraska and Kansas).

In 1991, all 53 abandoned and uncontrolled hazardous waste facilities in the State of Missouri were assessed for their risks to human health. Another 27 assessments were conducted on other possible hazardous waste facilities. The Bureau also established a new risk assessment program in cooperation with the EPA. Missouri is the only state health agency in the nation that provides this service to the EPA. We are committed to helping the other states in our region develop this capability as well.

In cooperation with the Bureau of Health Data Analysis, the Bureau reviewed eight Resource Conservation and Recovery Act health profiles for the Department of Natural Resources. These are profiles of the health status of a community surrounding a proposed resource recovery facility doing battery recycling, electrical equipment refurbishing, or waste incineration. Clean-up assessments--development of safe residual contaminant levels--for fifty sites in the state were also produced.

The Pesticide in Groundwater Monitoring Program is another area of involvement by the Bureau. Since 1986 we have been sampling private drinking water wells in selected areas of the state

for agricultural pesticides. This year we almost doubled the annual sample collections with over 300 samples being collected from the west-central and northwest portions of the state.

Indoor air investigations involving 120 homes, businesses, and major industry buildings were completed in 1991. Inspections for the presence of asbestos in 122 public buildings were completed. Of the more than 2.4 million square feet inspected, approximately 15% was determined to have some type of asbestos containing materials present.

As the primary state agency responsible for implementation of the Lead Contamination Control Act we received results of testing and questionnaires sent to over 2300 school districts, private and religious schools and day care centers. A detailed report about this program will be in the next issue of the *Missouri Epidemiologist*.

We issued the annual Fish Consumption Advisory in June 1991 which emphasized that carp and catfish in many water bodies in the state are still contaminated with chlordane and other pesticides at a level of health concern. In order to better understand the exposure to persons from eating these fish, we completed an exposure study under contract with ATSDR. This study found that persons eating carp and catfish from areas in Missouri under advisories are almost five times more likely to have levels of chlordane related chemicals in their serum than persons who eat no fish from those areas. The results raised questions about how advisories are developed because there was not the expected positive relationship between high serum levels and eating fish from the most highly contaminated areas.

Finally we are conducting another study with ATSDR, the Jasper County lead exposure study. Preliminary results indicate a significant relationship between living in an area that has been mined for lead and high blood lead levels. This study is part of a much larger national effort to understand lead exposure and final results are not expected until the fall of 1992.

HIV-related Immunologic Finding Now Reportable

The Department of Health filed a rule change to make **T-Helper (CD4+) lymphocyte count on any person with HIV infection** a reportable finding in Missouri. This change to 19 CSR 20-20.020 became effective October 12, 1991. This change is intended to allow the Department of Health to collect information on the degree of severity of illness of persons with HIV infection in order to facilitate efforts to evaluate health care and referral needs and to project the future needs for these services. This change is also consistent with the Centers for Disease Control's change in the definition of "AIDS" which, effective April 1992, will include "HIV infection and CD4+ lymphocyte count of less than 200/mm^3." The reporting form for HIV infection is currently being modified to allow health care providers to submit CD4+ lymphocyte information. **For further information, please contact the Bureau of AIDS Prevention at 314/751-6438.**

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